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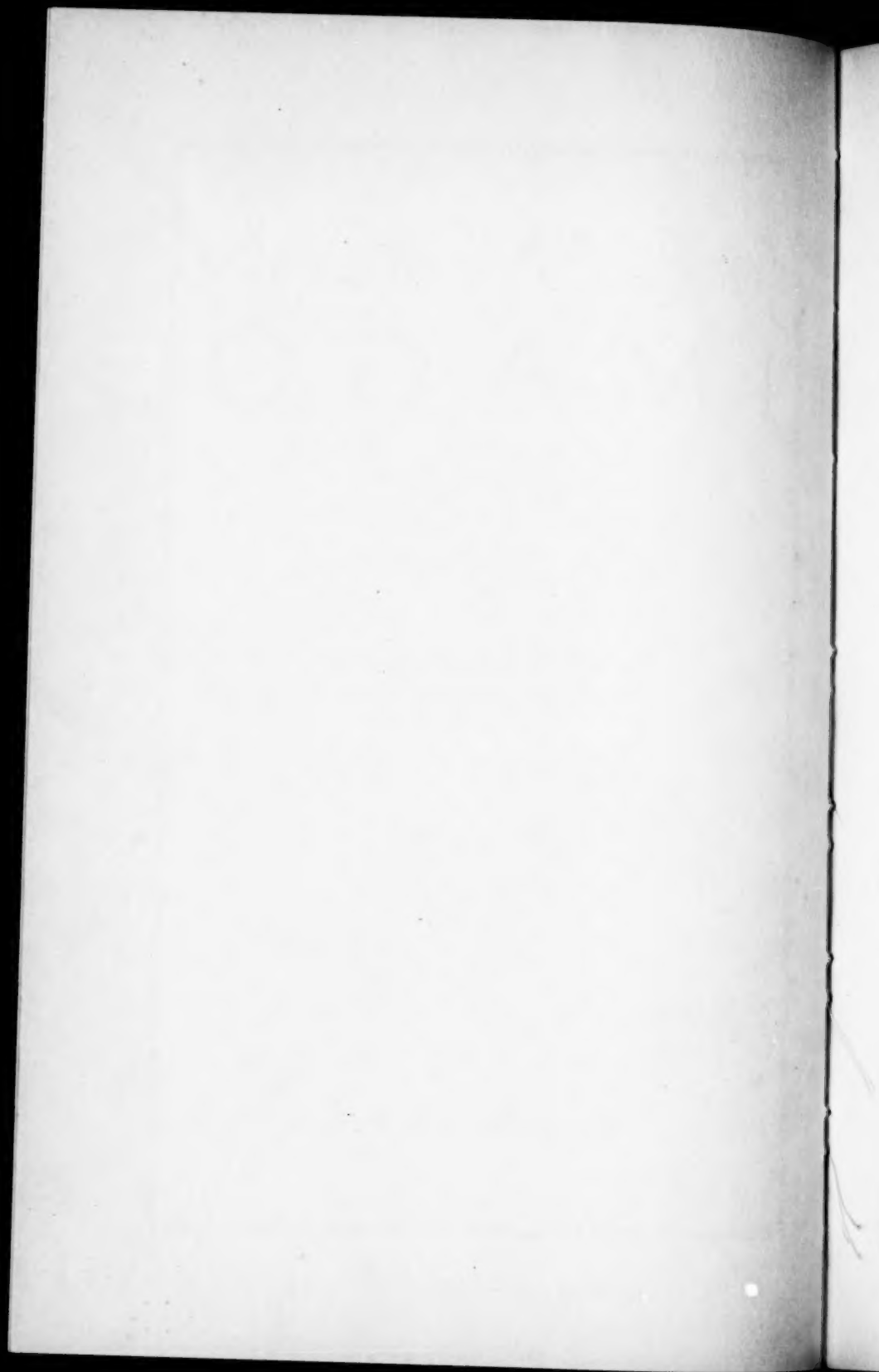
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THE MYTH OF THE CORPSE IN THE CAR

By MARIE BONAPARTE, PRINCESS OF GREECE

The following story was told to me by a friend and psycho-analytical colleague in the autumn of 1938 when the accord of Munich had removed the immediate threat of war. He guaranteed the full authenticity of his report, which I repeat here verbally.

1) A young man who in September 1938 expected to be called up for service within a day or two brought his fiancée to Laval where he wanted her to stay at the house of relatives. In leaving Paris he stops for gasoline. A middle-aged couple asks him where he is going and learning that he is on his way to Laval entreats him to give transportation to the wife, who wished to go in this direction, whereas her husband had to stay behind to join his regiment next morning. The fiancée cries on the way and speaks about their separation. The other woman reassures her that there is no cause for crying. "You certainly will not be called to arms because there will be no war. Furthermore, Hitler will be a dead man within six months." She repeats this several times. At their arrival in Laval she says goodbye and asks the young man if and at what time he wants to return to Paris. He answers that he will go back presently.

The woman advises him not to travel just now, because being on his way during the night, he would find a corpse in the car. Once more the two young people consider her as a bit soft in the brain and leave her without asking for her name or address. The relatives of the young man in Laval request him to take in his car a young friend who expects his mobilization. He consents. The new passenger declares when they are well underway that he feels sleepy. He lies down on the back seat and goes to sleep. When the car stops in Paris, at the address of the passenger, the driver tries to wake him and finds that he is dead. "Who is this woman?"

It was a year later in the autumn of 1939 when Hitler in spite of the predictions had lived long enough to start the war, when another anecdote was reported to me. This time it had been told by a masseur of the Hamam (Turkish bath) to one of his patrons,

but it was accompanied by the same assurances as to its authenticity. It had happened, as he said, to the brother-in-law of another of his patrons, of whom he gave even the name. I report again the text word by word, as I got it over the telephone from the mouth of the same masseur.

2) "A gentleman gets his mobilization order. He goes by car with his wife and his daughter to Versailles. It gets late; he says to his wife: 'I shall not have gas enough to make the hill.' At 200 or 300 meters before they arrive on the top of the hill of St. Cloud, the gasoline gives out. He gets out, looks right and left but nobody is in sight. Under some trees he finally finds a group of gypsies. He calls them to lend a hand and push the car up to the hilltop. The gypsy, however, tells him: 'You will not get back tonight before you have a corpse in your car.' He gets his gasoline. On the way back before he reaches Paris, he is stopped by a police officer, who asks him to bring a wounded person to the hospital. The man had said to the gypsy: 'If you are such a good prophet, why can't you tell me when the war will be over?' 'In the fall' had been the answer, 'after great things have happened.' "

My first reaction was in both cases to be impressed, as a good rationalist, with the improbability of the story and to smile at the credulity of my informants; yet these did not show the same form of credulity; it had a different aspect with the masseur.

But we analysts are trained to take all productions of the imagination seriously, even those which appear most foolish and extravagant and so I could not help being impressed by the resemblance of the subjects presented in two analogous versions: an intensely wished for event, the realization of which is guaranteed by a death which has been foretold together with the event. Hitler, the redoubtable enemy, will perish; he will die like the passenger in the car, who is already dead. The war started by Hitler must be over soon; it will end as a wounded man picked up on the road has come to the end of his life before the car has arrived at its place of destination.

Soon I learned that various versions of the same story had been spreading and are still spreading all over France and even could be found in foreign countries; the tale of the corpse in the auto was thus elevated to the rank of a collective myth. I shall try now to explain its tendency and its meaning by interpreting the two

versions already reported which are the most typical ones, and mentioning occasionally the other versions which I have been able to collect later.

A connection between cause and effect seems to be implied which is more deeply rooted than the simple fact of the truth of one prediction guaranteeing another.

Why in both cases is the guarantee given by the death of someone? Any other event would have done as well: a dog run over on the road, a tree thrown down by the car, a motor trouble which could not be repaired, or even some piece of unexpected luck that would be learned shortly after the arrival, e.g. winning a big sum of money in the Loterie Nationale.

But we feel at once that the three first named events are too trite to guarantee such a great, immense bit of luck as the timely death of Hitler, the arch-foe, would be or the victorious end of the war for which he was responsible.

The winning of the big prize in the Loterie Nationale would be even less adequate. Two lucky chances, one coming alongside of the other would be really too much! The death of an occasional passenger is an incomparably stronger guarantee. It makes the verdict of destiny appear to be peremptory.

The minds of our contemporaries have been so deeply impressed by the prediction of good luck which was warranted by death, the myth had spread itself over all France and even farther by this sole reason: the war with its sufferings and dangers could not fail to restimulate in the depths of our souls one of the oldest beliefs of humanity, in this case the belief that in order to receive a great benefit, a sacrifice is called for.

In their "Essai sur la nature et la fonction du sacrifice"¹ Hubert and Mauss say very justly that "sacrifices generally were intended mainly to be gifts which bestowed to the faithful claims on his god—no matter if the offering was human, animal, or vegetable, and that it made no difference in this respect if they were for the purpose of communion, expiatory (*piacula*), propitiatory or so called simply honorary" (I, for my part, don't believe that anything of the sort was ever done quite disinterestedly). Then, after discussing the theories of sacrifice of Robertson Smith and of Frazer, who derive its origin from the totem-rites, Hubert and Mauss say: "We say

1. L'année sociologique, Paris, Felix Alcan, 2 année 1897-1898.

that a subject 'offers a sacrifice' who thus tries to earn the benefits of the sacrifices or to experience their effects. This subject is sometimes an individual or a collectivity, family, clan, tribe, nation . . ." (p. 37). Later on, in discussing the preliminary consecration of the victim: "It is evident which is the distinctive trait of the consecration in the sacrificial ritual. The consecrated object serves as an intermediary between the person who offers the sacrifice and the god to whom the sacrifice is devoted." (p. 38). Further our authors give a definition of the sacrifice and differentiate it in this way from a simple offering: "Sometimes the consecrated object is simply offered as an *ex voto*. . . Those first fruits which were only brought to the temple remained there intact and belonged to the priests. In other cases, however, the consecration destroys the object which is presented; when an animal is presented on the altar, the purpose intended is not achieved till its throat is cut or it is torn to pieces or consumed by fire, in one word *sacrificed*. The object thus destroyed is the *victim*. Evidently the name sacrificed ought to be reserved for offerings of this latter sort. The difference between the two ways lies in the fact that they are widely dissimilar in respect to their seriousness and efficiency. In the case of the sacrifice the religious energies which come into play are much stronger. . ." (p. 39).

It has become customary, our authors say, "especially in Germany to place the sacrifice in a certain number of distinct categories: speaking, by example, of expiatory sacrifices (*Suehnopfer*), sacrifices for thanksgiving (*Dankopfer*), sacrifices for demand (*Bittopfer*), etc. As a matter of fact, the borderlines of these categories are quite uncertain." (p. 42). All sacrifices made to the gods turn out to be in fact *bargains*, where man pays the price either beforehand or after having received the benefit: it is the discharge of an old account with the god in the expiatory sacrifice; the payment of a bill of goods received in the thanksgiving, and payment in advance in the case of the applicatory or propitiatory sacrifice. Man as well as the gods made in his image, are good businessmen. In all cases the victim, whatever it may be, has to be sacrificed, that is has to be destroyed, evidently because man did not find a better way to send to the other world, inhabited by the gods, the gifts which are agreeable to them. Moreover, his profound and universal sadism finds a gratification without coming into conflict with his con-

science since he accomplishes with this act his duty towards the gods.

The question has been discussed a good deal if human sacrifice has preceded in historical order the sacrifice of animals or if it was the other way round. In the *Encyclopaedia Britannica* the article on Sacrifice² reads as follows:

"Many theories of the relation of human to animal sacrifice have been put forward, most of them on an insufficient basis of facts. It has been held that animal sacrifice is the primitive form and that the decay of totemism or lack of domestic animals has brought about the substitution of a human victim; but it has been also urged that in many cases animal victims are treated like human beings and must consequently have replaced them, that human beings are smeared with the blood of sacrifice, and must therefore have themselves been sacrificed before a milder rule allowed that an animal should replace them." (p. 983).

From the viewpoint of psychoanalysis the second hypothesis appears as probable.³ The Freudian concept of totemism and of the sacrifice of the totem-animal as a substitute for the primeval father of the horde, killed by his sons, who wanted to get possession of the

2. Eleventh Edition, 1910-1911. Article Sacrifice by Northcote Whitridge Thomas, M. A.

3. Freud, *Totem and Tabu*, 1931. Freud quotes Robertson Smith's reconstruction of the totem-meal in its primitive and archaic form: The totem-animal which is considered as the ancestor of the clan and therefore, as sacrosanct, must never be hurt or killed, is devoured ritually by the community. He links on to this the hypothesis of Darwin that the primeval horde consisted of a strong and jealous male who dominated a harem of females and expelled the sons when they grew up and became eventual rivals. In this way Freud arrives at his own hypothesis:

"Some day the expelled brothers formed an alliance, killed and devoured the father and in this way made an end of the father-horde. Together they dared and accomplished what would have been impossible for the single one. (Maybe a cultural progress like the use of a new weapon had given them the necessary self-assurance.) To devour the victim after the killing was for the primitive cannibal the natural thing to do. The forceful and despotic primeval father had certainly been the envied and feared prototype for each of the brothers. Now they accomplished the identification by the act of eating; every one of them appropriated to himself a part of the paternal strength. The totem-meal, perhaps the first feast of humanity, would thus be the repetition and commemoration of this never to be forgotten crime which became the starting point of so many things: social organizations, ethical restrictions and religion."

The sons who from now on formed a brother-horde renounced, dominated by their own remorse, the repetition of the crime. The life of the father was made inviolable after the deed had been done; the totem-animal, the "ancestor" of the clan took his place and it was strictly forbidden to kill it except in the ritual "feasts." Likewise by introducing exogamy they cut themselves off from the women of their own clan who were the substitutes of the females possessed by the father and desired by the sons.

females, throws a new and unexpected light on a problem which has baffled the pre- and extra-analytic sociologists and the ethnologists. Their demur to admit the precedence of the primitive human sacrifice is nothing else than a consequence of the repression of the initial parricide, which, for this reason, they reject with anger and contempt. The same mechanism by which in the past the totem-animal was substituted for the father and later for human victims of any sort, works out the identical substitution on the psychological level. The myth itself, however, has conserved sufficient evidence which speaks clearly to those who are able to listen, and tells us the real sequence of events: the ram on the sacrificial pile of the Hebrews takes the place of the son of Abraham, and on the Greek altar the doe is substituted for Iphigenia.

All the same, the opponents to the priority of the human sacrifice are not always wrong, if credit is given to certain signs. Isaac when he ascended the mountain of the sacrifice looked out for the ritual lamb. The *Encyclopaedia Britannica* says further (p. 983): "If tradition is any guide, human sacrifice seems in many important areas to be of secondary character; in spite of the great development of the rite among the Aztecs, tradition says that it was unknown till two hundred years before the conquest; in Polynesia human sacrifices seem to be comparatively modern; and in India they appear to have been rare among the Vedic peoples. On the whole, human sacrifice is far commoner among the semi-civilized and barbarous races than in still lower stages of culture."

We analysts will answer that, without prejudice to the new documents which the ethnographs may be able to furnish, we will insist on the general psychological rules of the regression and of the return of the repressed. Just as the human figure of the deified first father reappears bit by bit among the animal-gods who occupy the Pantheon of the Egyptians, even so the human victim could have been reintroduced to replace the animal victims, and, by way of a secondary substitution, be reinstated on the altar or on the pyre.

In our modern myth of the corpse in the car the return of a human victim to be offered as a propitiation of destiny was enjoined by a powerful regression as the natural consequence of the war and the anxiety imparted by it. The real content of this myth is nothing more or less than a human sacrifice which is performed

on the simpler level of wishful thinking and of fantasy. The comparison of the different steps and elements of the classic sacrificial ritual, as described by Hubert and Mauss, with the elements and steps of our myth of recent times will permit us to establish the deep interrelations between the latter and the human sacrifices of our remote ancestors.

Hubert and Mauss in studying the *scheme of sacrifices* distinguish three important phases: The *entering* into the sacred world, the *sacrifice* itself and the *departure*. "The sacrifice" so they explain "is a religious act using as intermediaries agents of an essentially religious nature. Now, generally, before the ceremony neither the person who offers the sacrifice nor the one who performs it, nor the place, nor the instruments, nor the victim have this qualification in a sufficient degree. The object of the first phase of the sacrifice is to give it to them. They are profane; they have to change their status. Therefore rites are needed to introduce them into the sacred world and to hold them there more or less strictly according to the importance of the part they will have to play later on. This constitutes, in the expression used in the sanscrit-texts, the entrance into the sacrifice." (pp. 47, 48).

All sorts of rites of purification like ablutions, fasting, continence, segregation from other people are the means by which different peoples aim at putting the sacrificer into the state of "sacredness." In regard to our myth we will have to ask first of all: who is the person who offers the sacrifice, the person who is benefited by the sacrifice which is going to be enacted? Evidently it is the young man called to arms who in one case goes to Laval and in the other to Versailles—the place of destination not mattering at all. What is it that performs the rites which bestow sacredness on the sacrificer? I believe it is the mobilization; to be called to arms, to be dedicated to the war and its dangers has made out of one who yesterday was an ordinary citizen overnight a sacred being; by receiving his summons of mobilization or by reading the poster calling up his class he enters suddenly the aura of "sacredness."

But where is the sacrificer? The victim that is sacrificed for the benefit of the person who offers the sacrifice must be the one who is doomed to die and actually dies. But he expires quite alone, in the backside of the car, without being throttled or slain. Only in the second version the passenger has already been injured, but no men-

tion is made by whom and how it was done. The sacrificer remains in the dark, he is enveloped by obscurity, due to the repression of our primeval aggression, growing steadily (who would believe it?), in the course of the centuries.

It is now just destiny which seems to kill the victim, to sacrifice it without assistance. However, as a matter of fact, the soothsaying woman, or the gipsy, plays by her fore-knowledge the part of the sacrificing priest or priestess; she is an incarnation of the homicidal deity or destiny. This is the reason why her words, when reported, produce such an unusual impression as if against the dark horizon of war appeared a sword of fire, ready to strike.

Anyhow, the victim is in every sacrifice the pivot of the drama, around which everything else is centered. We must try to discover the identity of the victim in our modern myth in order to determine what bestows on it the necessary character of sacredness. The stranger who dies on the back seat of the car is in one case a youth called up for military service, in the other an injured person. As one who is getting ready to go to war like the person who offers the sacrifice, he is excellently fitted to represent him. "The victim" write Hubert and Mauss, "is found to represent the one who brings the sacrifice also." (p. 66). He offers something in place of himself to buy off a misfortune or to acquire good luck. In the second version of our myth this aspect of the Unconscious becomes even more manifest: the victim has been already injured. If the war has been declared at this time, the young man, becoming a soldier, might have to go to the front any day and very likely would get wounded himself; another wounded person buys him off: the identity of the sacrificer and the victim springs to the eye. It is, however, the other one who is offered as a holocaust, whereas he will live and not even get wounded since the war will soon be over. Naturally, the other one by his injury has paid off the debt of blood which is exacted by destiny, the jealous deity.

One element, however, seems to be missing at first sight in our sacrifice, the ritual use made of the remnants of the victim. "The sacrificed victim" write Hubert and Mauss, "was similar to the dead whose soul resided at the same time in the other world and in the corpse." The sacrifice had been despatched to the other world to serve as offering and as messenger. Nothing is in the way to hinder the soul of our modern passenger in the car to take its flight

this way. But what will become of his sacred corpse? Our authors pursue their explanations: "Its remnants were surrounded by a religious respect, special honors were conferred on them. Thus the assassination left behind a sacred substance which was used, as we will see presently, to develop the useful effects of the sacrifice. For that purpose it was subjected to a double series of operations. What still subsisted of the animal was either given over entirely to the sacred world, or given over entirely to the profane world or divided between both." (p. 71). About the final fate of the corpse of our stranger the myth is silent.

What becomes of it is, however, so evident that it has not to be said explicitly. The corpse of the passenger will be given a funeral of the customary sort. It will not be eaten, neither by the one who offers the sacrifice, nor by the one who performs it; in this point this propitiatory sacrifice seems to diverge from the primitive community rites. It will be buried or incinerated after the performance of some religious or civic rites. This is equivalent to saying that the remnants of the victim will be entirely reserved for the gods, as in the Greek holocaust or in the Hebrew *olâ*.

Yet two more elements have to be considered in every sacrifice: the place and the instruments. Our authors say: "It is not sufficient that the sacrificer and the priest have been sanctified to let the sacrifice itself begin. It cannot be held at any time or at any place . . . The place of the sacrificial scene must itself be sacred; outside of a holy place, the immolation is nothing but murder." (p. 56). Some places are permanently sacred: the temples, as with the Hebrews; others are consecrated every time for the individual case, as with the Hindus, where everyone could choose the place which he wanted for the sacrifice; but this place had to be consecrated ahead of time by means of a certain number of rites of which the most essential was the kindling of the fires. (p. 57).

I started collecting several versions of our myth after those two first ones which had come to my knowledge. These versions will be stated later. One element remains constant in all of them, in spite of many noteworthy variations: the modern substitute for the altar or the pyre is the automobile as the place for the sacrifice and also, to some extent, as its instrument.

On this point the approach by ethnology or sociology does not help us any further. Only psychoanalysis and the knowledge

of the unconscious symbolism allows an understanding why the sacrifice has to be regularly accomplished in an automobile, however surprising these explanations may seem to those who ignore this new insight.

To move about in an auto is in dreams a frequent sexual symbol, the same as the going up a staircase or a mountainside. These are combined in the setting of the second version: the car is stopped on a mountainside by some defect. The young man who has been called to the colors performs in this symbolic way a sexual act. The presence of a woman—or of two—who is with him in the car corroborates this interpretation.

On the other hand, in both our cases the one who dies is a man: the victim, by being mobilized or injured, becomes a double of the sacrificer. The question may be asked how far a hint of the Oedipus-complex had an indirect influence on our modern myth of the death in the auto. The sacrifice could be understood not only as a propitiatory act, the opening of the way towards great happiness, but also as the expiation of an obscure crime, so that this good luck may become attainable. Instead of the young warrior another one would be sacrificed in punishment for an original sin, which, archaic and obscure, could be nothing else than the Oedipus-parricide. The sacrificer who flees from Paris in his auto—by which the sexual act is performed symbolically—with one or two women, could well represent the hero,⁴ the son Oedipus who after the murder of the primeval father performs the rape of the females for whose sake he has done the killing. The defect of the car or the missing gasoline could be taken as a memento of the castration, inflicted by the father. In order to be forgiven the guilty son buys himself off by sacrificing a mobilized or injured person (castration here again). The victim takes on himself the punishment after the crime as the scapegoat, or like Christ, who pays for all sinfulness of mankind with his blood; the deliverance from the guilt is worked by his death and this death occurs in the moving automobile, so that the retaliation repeats the crime and the sinner gets punished in the way he has sinned.

4. The myth which is a collective dream of mankind shows often, as in the story of Oedipus, a variant of Freud's hypothesis of the brother-horde in which a single and isolated son commits the original parricide and takes all the sin and all the glory on himself. This is the concept of the 'hero' who is sung by so many myths. Cf. Otto Rank, *Der Mythos von der Geburt des Helden*.

Yet the victim who is at the same time propitiatory and expiatory (are the victims of sacrifices ever entirely of one kind without the other?) pays as a supreme piaculum the price for the redemption, not only of our automobilist but for the entire nation. From now on all those who were called to the arms and who carried the same burden of unconscious guilt-feeling, are purified by the blood of one of their number and win a just title for their hope that they will save their lives and reenter into the paradise of peace either by the means of the death of the father or simply by the end of the war. So has Christ, the son of God, by his sacrifice which was at the same time expiatory and propitiatory redeemed from the original sin all men who are the sons of the eternal father and acquired through him their salvation, eternal life in the paradise of heaven.

The great Judeo-Christian myth differs from the myth of the death in the auto, the latter showing a more archaic regression; it ends by a triumphant and open return of the repressed. In the Judeo-Christian myth the parricide in the beginning can only be inferred by the retaliation which strikes down the sacrifice son-god.⁵ In the modern myth a reincarnation of the father appears in the end as being doomed to die. Is not the national enemy for the Unconscious the father of Oedipus, the primitive rival, the first foe of every youth, who is now projected somewhere outside of the frontier? Since the Oedipus-crime has been expiated by the victim who was sacrificed in the symbolic automobile, the crime may now be accomplished without fear of punishment. Hitler has been killed and the sons who had taken up arms may now all in peace enjoy their native land, the exalted mother. To observe the correct sequence in time is not necessary for the Unconscious and the crime may be permitted to follow after the punishment.

According to Hubert and Mauss we ought also to find in our myth the *departure* from the sacrifice, the return to the profane

5. S. Freud, Totem and Tabo, Part IV. "In the Christian myth the original sin of man is undoubtedly a sinning against God Father. If Christ redeems mankind from the burden of this original sin by the sacrifice of his own life, this forces on us the conclusion that this sin was a murder. The rule of retaliation as identical with the crime, has the deepest roots in human feeling; therefore murder can be vindicated only by the sacrifice of another life. The self-sacrifice points back to a guilt of blood. If this sacrifice of the Son's own life is necessary for the reconciliation with God Father, the crime which had to be atoned for can have been no other than the parricide.

status from the sacred status of sacrificial destruction. What corresponds in our myth to the "Ite, missa est," that finishes the Christian sacrifice? I believe that this ought to be understood as represented by the demobilization. In this way those who had been under arms will, after the death of Hitler and the victorious end of the war, get away from the sacred aura of the sin and of the sacrifice, which has in truth redeemed them and given them back to their normal ways of life.

I proceed now to report some other variants of our myth which I was able to collect. I started questioning all the persons around me with whom I came in contact even at the risk of being credited by some people with being possessed by a mania for "the corpse in the car"; I visited also several clairvoyantes in different parts of Paris and made them talk about it. The myth seemed to have sprouted, more or less, everywhere in the time between 1938 and 1940, and to have kept under different variations the same meaning. In nearly all of these cases a guarantee for the authenticity of the story was given; most often the person who told it knew personally someone to whom it had happened. The fantasies of the Unconscious assert their claims to implicit belief.

I report these versions literally, as they have been communicated to me either in writing or taken down on dictation.

First a version collected in November 1939, at an antique dealer in Paris, quartier d'Europe:

3) A young couple coming back from an excursion in their auto, had a mechanical breakdown on the road; while he is working on it, a woman passes by and, entering into a conversation with them, predicts the death of Hitler in the near future as well as that they will transport a dead person in their car. The motorists don't pay any attention to this prediction and after repairing the car go on their way. When they have nearly reached their point of destination, they are stopped by a hitch-hiker. The man gets in and the car starts again. Imagine their surprise when they find at their arrival that their passenger has died on the way. . .

We find here again the different figures of the sacrifice: the sacrificing man and woman, the victim and the auto, which is at the same time the place and the instrument of the sacrifice. The entering into and the departure from the sacrifice which in our

war myth are represented by the mobilization and demobilization are, however, not indicated, but may be assumed implicitly. The young husband could, in France at the time of war, be nothing else but either already mobilized or expecting his mobilization. The accompanying woman is expressly mentioned since it is "a young couple" who travel in their car. No special mention is needed that the consequences of Hitler's death will be the end of the war.

Next version was reported not much later by a collaborator of the "Nouvelle Revue Francaise." He says that he has heard it in November 1938, before the war, after Munich.

4) A gentleman from around Montauban goes in his car for a weekend excursion. On the road he is stopped by a man who looks like a poet or like a tramp; he thinks it is a hold-up. This man says: "Hitler will die on December 8, 1938 (or March 8, 1939)." He adds: "I'll give you a proof that what I have told you is true; I'll predict something that's going to happen. At such and such a place on the way to Blois you will let someone ride in your car and he will be dead when you arrive in . . ."

In fact, he comes to a place where an auto accident has just happened. A person is injured and has to be carried to the hospital without delay. At the place indicated the automobilist looks around and finds that the injured person has died."

The man who orders and the one who performs the sacrifice, and the injured victim are to be found here. Yet, everything happens among men — the woman has disappeared. The mobilization which precedes every war, is treated as a menace which floats in the air invisibly and needn't be specially emphasized.

Another version has been reported in November 1939 by a clairvoyante in Paris, quartier d'Europe as it had been told her by one of her clients, a Russian who asserts that he knows the woman to whom it happened and that she described it to him in March 1938 after Hitler's first move, the one against Austria.

5) A Suiss-German lady goes for a trip in her car with her chauffeur from Bale to Zurich. She has breakfast in Bale. Afterwards another lady says to her: "Don't be afraid of the war, Hitler will be assassinated before that. To give you a proof that I am right: It is as true as that you will have a dead person in your car when you arrive in Zurich." On the road they are stopped by the victim of an accident whom they pick up and who dies before they arrive in Zurich.

Here the magic is used to avoid the war before it has started. The victim is an injured person as in the variants 3 and 4. The sacrifice itself falls to the lot of two women, a noteworthy variant. Anyhow, the owner of the car has, as a double, her chauffeur, who without doubt would be subject to mobilization. The place of the sacrifice remains the same, the symbolic auto in which these two travel; the country is not any longer France, but a partly German-language country, Switzerland. German-Swiss felt that they were threatened after the annexation of Austria. National socialism was trying to win a foothold and they were afraid that they would be dragged into the great conflict which was hanging over all of Europe. The myth which counteracts the anxiety could, under these favorable circumstances, develop easily.

But we will return to those versions which react to the war after it has been declared.

A clairvoyante in Paris, quartier Saint Germain reported in December 1939 this other version:

6) A gipsy woman stops an automobile on the road: "Your father has a cerebral congestion and you will have a dead body in your car. It is as true as that Hitler will be dead within three months." The prediction turns out to be correct.

In this version, which is extremely succinct and without doubt has suffered many omissions, this element is of the highest interest: a serious illness of the real father is put in direct relation to the death of Hitler, the father enemy.

The sacrificial murder becomes more transparent in the following versions than in those already mentioned.

In December 1939 I could collect the two following versions, first from a chauffeur in Paris, quartier de la Muette, and later from his wife. It was the latter who had made him acquainted with a person who, it was said, knew the hero of the story. This is the original version obtained from the wife of the chauffeur:

7) A gentleman going his rounds in his auto meets a woman who asks him for a place in his car. He complies with her request. They start a conversation. The woman says that she will tell him his future. The gentleman declines under the pretext that it does not interest him in the least. His traveling companion answers: "Alright, in any case I can tell you that you will have with you in

a few days a man who is doomed to die and when he dies, Hitler will die too." The gentleman had quite a few worries through the formalities caused him by the death of this man.

Distorted version of the chauffeur:

8) A lady told that a fortune teller had predicted that she would take a gentleman into her car, that she would have an accident with him and kill him. She had also foreseen that Hitler would die in the same year. The lady took a gentleman into her car, they had an accident and he was killed.

We may observe as an interesting trait that in the version of the chauffeur's wife a man drives the car, whereas in that of the chauffeur it's a woman driving and causing the accident. It expresses the small esteem in which the chauffeur holds women as drivers. But the greatest interest of the story lies elsewhere: in the version of the chauffeur the lady automobilist who brings the sacrifice has become the sacrificing priestess as well, much more so than the distant fortune teller, since she herself kills the passenger by means of her auto. Here the guilt of murder is not laid exclusively to fate. If the male automobilist in the version of the chauffeur's wife "had quite a few worries through the formalities caused him by the death of this man," it was so because he too by his lack of skill in driving or in some other way was responsible for his death.

Besides, Hitler is not the only big enemy whose death has been predicted and guaranteed by a human sacrifice, especially by the corpse in the car. The following event took place in the spring of 1939, at a time when the attacks of the Italian press became more vigorous from day to day and Mussolini, therefore, was not popular in France, especially in the South. I got the report in November 1939 from a young woman in Paris, quartier Auteuil who told me that she had it from another lady, the friend of the wife of a doctor from the district Var, who, in her turn, of course, knew the person to whom it had happened.

9) An automobilist in the South has a motor defect. A gipsy woman whom he meets predicts that he will have a corpse in his car before arriving at Toulon — for the gentleman had been called from Nice to Toulon by a member of his family who had fallen ill. The gipsy predicts the corpse near Toulon, his sudden return to Toulon to be near a sick person and the assassination of Mussolini at the end of April.

The sick person in this story is a parallel to the father who has a congestion, in version 6. The company of a woman is omitted as in version 4 whereas in other variants the feminine element appears in a changed place. We will find it in the center of interest soon.

I tried to investigate this subject of the "corpse in the car" that predicts the end of the misfortunes of war in other countries in arms. I wrote to my friends in England; they said that they couldn't find anything for a time in this country which was too sure of itself. From Greece where I stayed some weeks in the winter 1939-40 I could correspond with relatives in Germany. I learned from them that the story of the corpse in the car was current there too and predicted the coming triumph of Germany, eventually the assassination of Chamberlain and Daladier. Unfortunately no precise text was transmitted.

I was advised by a psychoanalytic colleague from England of the following letter, dated May 8, 1940 and signed by Mr. Charles Madge of "Mass Observation," the organization which investigates there the popular reactions. Here is the letter:

"Dear Dr. Melitta Schmideberg, the question which you ask in your letter is of greatest interest; the motives which are at the bottom of these stories certainly ought to be psychoanalysed.

First, the story of the gipsies. Under various forms it has been circulated for at least five years. It arose at the time of the death of George V, at the moment of the abdication of Edward VIII and of the coronation of George VI. Every time it seemed to implicate the wish for the death of the ruler in question. It has been discussed several times in the daily press (for example by the "Evening Standard" in 'London's Diary'). "Mass Observation" was often informed about it by word of mouth or by letter. Even before Munich the story got a new turn and was from then on applied to Hitler; after the regular prelude concerning the finding of a corpse in the car, comes the prediction that Hitler will die at a certain date. This story was particularly popular in September 1938..."

We may conclude from this short investigation that under different climates similar subjects take hold of the imagination of the people when they feel themselves threatened by a cruel war

from outside or in some other way as by the death or desertion of their rulers. The wish-fulfilling myth of the corpse in the car helps to bind the free-floating anxiety and, in nourishing the hope, to keep the courage up for life and victory.

Probably a similar myth of a corpse in a horse drawn carriage or in a diligence, in one of the conveyances used at that time, was circulated in England and on the continent at the epoch of Napoleon for the purpose of predicting the death of the "Corsican ogre." If nothing is to be found in the old archives, this is probably due to the fact that no notice was taken of it then.

I found even a contemporary version which regresses from the auto to the horse drawn vehicle. The wife of the same psychoanalyst to whom I am indebted for the first version of the myth told me in Saint Tropez on September 9, 1940 the following story which she had heard in Paris before the war, in May 1939, (a short time after her husband had heard the version 1). She got it from her milliner, whose shop was in the Avenue Victor Emanuel.

10) A woodcutter in Switzerland went one morning to his work in the woods. He meets on his way a gipsy woman. They start gossiping and the man tells her that he feels worried, he does not know what to do; he would like to buy a piece of land but he is afraid of the war. The woman: "You may be sure that there will be no war, because Hitler will be dead in two months." She is as sure of that as she is of his having a corpse in his cart the same evening. That afternoon, some men hunting in the woods come to him and say: "We see that you have a cart; couldn't you transport a man who has been wounded during our hunt to the village?" The man is put on the cart, the woodcutter sits in front and drives to the village; when he arrives and looks back he finds that the man has died in the cart.

Somewhat later I was able to discover a thoroughly different version of the same sacrificial theme. A young friend of ours who came from the school des Roches in Normandy to Saint Tropez (Var) brought with him this summer the following version which he had collected in Normandy shortly after Whiteside 1940:

11) "A professor of mathematics perfected his calculations to a high degree of precision. He had predicted nearly to the day the

invasions of Norway and of Holland. For his amusement he predicted to his janitor that an accident would befall him at a certain date. To that he added: "Hitler has not more than six weeks of life from today." The accident really happens: the janitor is run over by an automobile.

Here the car, the place of sacrifice, becomes also its instrument. The victim is evidently the janitor, as an indifferent representative for all the French who are to be saved. The sacrificer becomes invested with the characteristics of the antique soothsayer and his terrible secret power and knowledge in the modernized form of mathematics.

I have reserved for the end what seems to me the most instructive of the versions which I was able to note down.

A clairvoyante, this time of the quartier de la Muette, Paris, communicated to me in December 1939 the following version; she had it, as she told me, from two young girls, her clients, whose father owns a big cheese factory in Normandy and her belief in it was as strong as steel.

12) A gentleman stops because of a motor defect on the road Paris-Soissons. While he overhauls his car another auto passes by and stops. One of the passengers gets out and asks him if he can help him. The man who thinks that he will be able to do the repair work himself, thanks him but, observing that the other one speaks with an accent, asks for his nationality. "I am a German." Now a conversation gets started about events. "How are you getting along?" asks the Frenchman. "We haven't enough left to last us for a long while," is the answer. "Really? And Hitler?" "Hitler? Hitler will be dead in a short time and that is as true as that presently, when you are on your way again in your car, you will be stopped at a grade crossing and asked to bring a woman who had had an accident to a hospital, and that this woman will die before you arrive." The prediction of the German became true in every point.

Here, in this version, the sacrificer and the beneficiary are both present, but they belong to hostile nations and therefore are subject to the mobilization on different sides of the frontier. The most outstanding variation, however, is that here again the woman as companion is absent, but that she appears

instead in the more important role of the victim. The victim is not any longer a man who expects to be called to arms, but a woman—yet one who has suffered an injury. In the wars of our time the women are certainly not exempted from becoming the victims of bombardments from the air or from torpedoes. The injured woman in this version recalls in this way the injured passenger of the second version, who was also taken up on the road and who, by means of his injury, represented a duplicate of the young man who had been mobilized in the first version. All the same, the victim of the expiatory and propitiatory sacrifice is in this case a woman and therefore cannot stand in the place of the son who expiates the Oedipus-crime.

Yet, if we bring the two major divergences of this variant together, they may explain each other in reciprocity. If the woman as companion is absent this may be just a sign that she has been merged into one person with the woman victim. The automobilist, the guilty son of the Oedipus-crime, has been compelled to give back to the father represented by fate the desired object, the woman, for whose sake he has committed the murder. It seems to be full of meaning that a third divergence makes here of the prophet who is, like the woman and the gipsy in other versions, the priest and the incarnation of the Deity, a compatriot of Hitler, the hostile father. To him the booty of the crime has to be restituted—that is the implicit meaning. Not till this self-punishing restitution has been performed, can the wished for crime be executed: then the Oedipus revolution will break forth, the united sons will kill the father-dictator, the French and Germans, brothers now instead of enemies, will embrace each other, peace will be reborn and the citizens will lay down their arms and enjoy again their mother in the most exalted and purest form: their liberated country.

We may think here of the sacrifice of Iphigenia in order to obtain from the gods the favorable wind, of Jephta's daughter who was offered as a thanksgiving, of all the female victims who were immolated on real or mythical altars. The gods ask sometimes as well for the children of their worshippers, and Jahwe who demands from Abraham his son is acting like the bull-god Baal Moloch.

In these latter cases where the bitter Oedipus-rivalry is displayed and incites the father to sacrifice a thing that he would

cherish otherwise, one characteristic element of the sacrifice comes to the foreground: the deity asks man to give what he holds most dear. "Take Isaac, your only son whom you love. . .," orders the Lord. It is the acquiescence with such a grandiose sacrifice which guarantees the favor of the gods given in exchange for it.

This sort of sacrifice expresses the psychic antithesis of the divers versions of the myth of the corpse in the car, which have been reported hitherto. In these only strangers died as they did in Tauris on the altar of Artemis, people with whom the sacrificer, in this case the automobilist, had no ties of real affection. In prehistoric times, after the primitive parricide, the repetition of the heinous crime was certainly performed on strangers, on prisoners of war—as much later with the Aztecs—by projecting the primitive father on to an enemy. Thus the sadism of man could find a way to be satisfied without being hampered by the fetters of ambivalence.

The growing interiorization of morality, however, had the effect of directing the aggression of the offender against himself; therefore the gods insisted more and more that the sacrificed object must be dear to the heart of the sacrificer, making this the condition from which the validity and efficiency of the sacrifice was derived. With a progressive interiorization of the aggression it may even happen that the sacrifice offered to the gods becomes the ritual suicide, of which Frazer reports many instances; an echo of these customs may possibly be found in the offer made by Pius XI to God of his own life in order to save the world from the war, or in the prediction of Therese Neumann, the German clairvoyante, that Hitler would die three months after her own death.⁶

I have been able to collect, with the help of the *Paris-Soir* where an advertisement was inserted asking for the communication of prophecies concerning the end of the war, other myths instead of

6. Cf. James George Frazer, *the Golden Bough*, abridged edition, London, MacMillan and Co., 1922. Chapter XXIV, pp. 274, 275: ". . . This province has a king over it who has not more than twelve years to reign from jubilee to jubilee. . . when the twelve years are completed, on the day of this feast there assemble together innumerable people, and much money is spent in giving food to Bramans. The king has a wooden scaffolding made, spread over with silken hangings: and on that day he goes to bathe at a tank with great ceremonies and sound of music, after that he comes to the idol and prays to it, and mounts on to the scaffolding, and there before all the people he takes some very sharp knives and begins to cut off his nose, and then his ears, and his lips, and all his members, and as much flesh of himself as

new versions of the myth of the corpse in the car, and among them the following 'dictum':

"I can tell you of a saying which is at present current in La Correze and is expressed in these terms: During the siege of Paris in 1870 a bishop of Tulle died three months before the armistice, in 1918 another bishop of Tulle died three months before the armistice and you may easily inform yourself of the fact that another bishop of Tulle died about forty days ago. You can conclude therefore that the present war will be over in a month and a half or two months. I don't know if the dates of the death of the first and second bishops are accurately three months before the armistice; it is up to you to get the confirmation. Signed: Lavergne Leopold, Caporal aux armées, 9 Decembre, 1939."

The actual reality of the three months is without significance; it is the psychic reality which interests us. Tulle was proud enough to aspire for the honor of becoming, in preference to all the other towns of France, the altar where the human sacrifice, at the same time propitiatory and expiatory, is offered by which France is redeemed in every time of danger. The pious bishops if they had been given the choice, would have consented willingly to offer their lives as a voluntary sacrifice for the salvation of their country, as had been done by Pope PiusXI, and the German clairvoyante.

Christ, sacrificed by his father but consenting and taking his cross on himself is the ideal which all faithful souls try to imitate. The self-sacrifice, when it takes a form by which life itself can be continued, becomes the source, the commanding power of all the asceticisms, all the renunciations which are "offered to God." They remain, however, for those who believe in them the objects of a bargain of such a sort that is advantageous to them since God will bestow on them in exchange for the passing sorrows of this world the eternal bliss of heaven. This calculation also forms the basis of Pascal's wager.

he can; and he throws it away very hurriedly until so much of his blood is spilled that he begins to faint, and then he cuts his throat himself. . . ." The king of Calicut, on the Malabar coast, bears the title of Samorin or Samory. . . Formerly the Samorin had to cut his throat in public at the end of a twelve years' reign. The aim of these barbaric customs seems to be to attain assurance for the prosperity of the kingdom by the ritual, periodic suicide of the king. Similar sacrifices in our midst when they are offered to heaven, take a less sanguinary and repulsive form.

In this way the sacrifice has passed through numberless stages; the greater part of them are still alive among us. For this reason we may assume that in collecting a greater number of versions of myths prophesying the death of Hitler or the end of the war, it would be possible to discover, thanks to the different grades of regression, the revival of all the different stages through which the universal practice of sacrifice as a means to propitiate the gods has passed.

FREUD IN LIFE AND DEATH

By EDWARD HITSCHMANN, M. D. (Cambridge, Mass.)

Freud is buried and his followers or pupils will see or hear him nevermore. What did he look like? men will ask. Such a great man must have looked serious and solemn, some may argue. As a man who knew all the foibles and wickedness of people, he was certainly severe and inaccessible. What did he really look like, what was his attitude? One who knew mankind and all its types so thoroughly, would scarcely wear a curly head and a wild growing beard like a philosopher, a broad brimmed hat like a painter; he would scarcely look like the narcissistic dandy or shabby like a miser.

Freud looked artless, not striking, like other intellectuals or physicians; in a well fitting suit of fine quality, always with a black tie—he just seemed not to have wasted much time on his appearance. He was never solemn or withdrawn, always friendly and encouraging, in a word—human.

It is a pity that it is so difficult to change the neurotics profoundly. Most people come too late, in a too advanced state of their illness to the psychoanalyst. Freud smiling liked to quote sometimes the sceptical sentence: "Three things are impossible: to rule, to educate and to cure." "Washing negroes white"—he insulted his work in such moments of disappointment. Experience had shown him that it is impossible to rebuild a human mind in a short time, to change a character. So he warned of "furor therapeuticus." For him working with a patient had to bring new knowledge, and he pitied those psychotherapists, and laughed at them who, attempting to use suggestion, repeat the whole day the same recommendation. He always intended to understand thoroughly; so music did not interest him, because he regarded it as an unintelligible language. He was above everything inquirer; he would have devoted himself—if it had been necessary—to research only, without prospect of healing. He left behind him the deepest, most protracted, but in severe cases the unique method for curing. He compared Psychoanalysis with digging out, excavating, toiling underground—dealing with the unconscious. Excavations of antiquity decorated his

desk and cabinets in his working room. In contrast he saw a wild goose-chase, leaving reliable ground, in all metaphysics, credulity and faith—instead of knowledge through deep-digging investigation. Science, knowledge, logos were his gods. He refused to accept religion in place of science in "The Future of an Illusion." When I once told Professor Freud about the progress in my biographical work concerning the Swedish poetess Selma Lagerloef, he considered it as a natural process, that the poetess, who later became so religious, was as a child full of feelings of guilt: "It is the same thing," he said smiling. I was told by Anna Freud that her father had read the manuscript and praised it—this was during the last months of his life—which I appreciated very much, as well as his word "excellent" written on a proof of my book, giving the first compilation of "Freud's theories of neuroses," a sheet I still preserve.

It is not the place here to judge Freud's work: I only intend to report some human traits of his character. He liked witty sayings very much. When he was reproached with the fact that some of his early pupils showed later a behavior, which was perhaps not unobjectionable, Freud smiling remarked: "Does one know today with whom Columbus went when he discovered America?"

The conception of "sublimation" dawned on him, when he was told that the surgeon Dieffenbach as a student cut off the tails of dogs and became later a famous operator. A similar impression was given him by a picture in a comic journal, showing a girl first as a shepherdess of geese and then as guarding a flock of young girls. This image seemed to him better than some thoughtful definitions by one of his pupils. He complained sometimes that he was taken too literally by followers. He wasn't dogmatic. He was in favor of an indulgent and kind training and used to advise his own children before guests came in: "Don't stick to your company manners, children!"

His learning was very extensive. In early years he was already well versed in several languages and won Charcot's intimate friendship translating his lectures. It is less well known that he was also so perfect a student in English, that he was chosen to translate a volume of Stuart Mill's works into German.

Freud felt strongly in the matter of social progress, but he rejected terror and revolution. With grief and uneasiness he saw brutality and servility develop in Europe and the horrors of war. He

hoped to see Eros victorious against Thanatos, the death-impulse, but didn't live to see it. How long would he have had to live to see it?

In 1932, in his "New Lectures" Freud predicted the English-German war; Bleriot and Zeppelin, he understood, had broken through the protecting isolation of the sea. But when in 1938 the national socialists came to Vienna, persecuted and robbed Freud, destroyed the new and large Psychoanalytical Institute and the neighboring editorial office together with all books, Freud could still accept the generous invitation to England, which he had always highly esteemed. There he could finish his last work "Moses and Monotheism" and, in spite of his sufferings, go on working with pupils. But the neoplasm was progressing and, suffering from severe pains, brave and patient, Freud died, tenderly nursed by his daughter Anna. So a life came to an end which had been so heroic in so manifold directions!

It is natural to ask the question: Why was the life of this benefactor of mankind burdened for so many years by such sufferings?

The searcher for determinate relationships must attempt to illuminate with scientific insight the problem: Was the tragic end of his life altogether "accidental?"

Psychoanalysis is still a young science and not yet fully utilized. That the specific cause of a death also depends upon the constitution of the individual, is clear. But the connection between particular innate impulses and death, is not yet considered. Let us, for example, consider an individual with an intensive oral impulse. As an infant he may have sucked his finger intensively and may later have developed into an inveterate smoker. If greediness develops, he may become fat or have a tendency to drinking and so do damage to his heart. We don't know much about an organic basis for such strong innate impulses. But the possibility of a "surmenage" of the organs concerned exists. We know, for example, of the development of neoplasms on the lips of inveterate pipe-smokers. Of course we are not yet in possession of a sufficient number of systematic observations.

As psychoanalysts we have also to take into consideration psychological and unconscious aspects, such as displacement of the impulse, sublimation, etc; further feelings of guilt as consequence of over-

indulgence of an impulse. Excesses in a certain direction and comparison with more frugal individuals may favor hypochondriac and self-reproachful feelings. If there is really an organic effect of such an instinctive activity and a tendency towards localization in certain organs, at all events the psychical side plays an important part. Excessive indulgence of impulses may produce an illness or a neoplasm in a certain organ. But we must be very careful in our new assumptions; their assertion should be supported by statistics. At least we ought to investigate the causation of death in peculiar cases. Being interested in the cause of the death of Professor Freud, we would like to be able to ask him since he was in his writings as he said: "more sincere and candid than is customary with people who describe their life for their contemporaries or posterity."

Freud died from a neoplasm of the mouth, which began as an "Eplulis" on the basis of a leukoplakia oris caused by intensive smoking. Freud was a passionate smoker and smoking accompanied his painstaking working. We have learned from him that such excessive smoking is evidence of a strong oral impulse. Who knows psychoanalytical characterology, will find in his nature and unusual gifts several traits which prove this.

Moreover, Freud also published one of his own dreams which contributes more interesting material. The dream is among the additions to later editions of the "Interpretation of Dreams," but certainly occurred before his neoplasm appeared, perhaps in the years between 1915 and 1918. Freud has interpreted the dream partly himself. He uses it to illustrate his new conception of dreams of self-punishment. The wish which they fulfill, is not an unconscious wish coming from the repressed impulse-material; it is rather a wish of the Ego, reacting against the impulses, satisfying the Superego (conscience). The recognition of these dreams and their interpretation, adds an important new aspect to our theory of dream interpretation.

The dream runs as follows:

"Vague beginning. I tell my wife that I have a message for her, something quite particular. She is frightened and refuses to listen. I assure her, on the contrary, that it is something which she will enjoy very much, and begin to tell her that the staff-officers of the regiment of our son have sent a sum of money (5000 crowns?) . . . something of acknowledgement. . . distribution.

... Besides I went with her in a small room, like a store-room, to look for something. Suddenly I see my son appear, he isn't in uniform, but in a rather tight fitting sport-dress (like a seal?) with a little cap. He climbs on a basket, which is situated beside a cupboard, as if intending to put something on this cupboard. I call him. No answer. It seems to me that he has a bandage around the face or the forehead, he sets something right in his mouth, pushes something in. Moreover his hair shows a gray shimmer. I think: Can he be so exhausted? And has he false teeth? Before I can call him, I awake without anxiety, but with palpitation of the heart. My nightclock shows the time 2½."

Freud continues: "The report of a complete analysis here too is impossible. I restrict myself to calling special attention to some decisive points. Painful expectations during the day caused the dream; from the fighter at the front once again messages were missing for more than a week. It is clear that in the contents of the dream the conviction is expressed, that he is hurt or killed. In the beginning of the dream the effort is made to substitute the painful thoughts by the opposites. I have to report something highly delightful. Something about sending money, acknowledgement, distribution. The sum of money takes its origin in something pleasant which happened in my medical practice; in any case, its significance is that of distracting from the main theme of the dream. But this effort fails. The mother suspects something frightful and will not listen to me. The disguises are really too thin, everywhere shines through what should be repressed. If the son died, his comrades will send back his things; I shall be obliged to distribute, what he leaves behind, among brothers and sisters and others; officers get often commendations after their 'heroic death.' The dream evidently intends to express directly, what it purposed at first to deny, whereby the wishfulfilling tendency betrays itself by distortions. We don't indeed find out what supplies the necessary energy. The son anyhow doesn't appear as one who has been killed in the war, but as one who is climbing. He has really been a daring mountain-climber. He isn't in uniform, but in sport-dress, that is: an earlier accident represents the now feared one, when the sportsman fell on a ski-tour and broke his thigh. But the nature of his dress, in which he resembles a seal, recalls at once a younger person, our droll little grandson; the gray hair reminds

me of his father, our son-in-law, who was traumatized as a result of the war. What may be the reason? But enough; the place, a store-room, the cupboard, from where he likes to fetch something (to put something upon in the dream), all these are allusions to my own accident from which I suffered, when I was more than two and not yet three years of age. I stepped upon a footstool to fetch something appetizing which lay on a cupboard or table. The footstool tilted over, and its corner hit me behind my lower jaw. It would have been possible for all my teeth to be dashed out. An admonition resounds thereat: That is an appropriate punishment, for it is really a hostile sensation against the brave fighter. The deepening of the analysis lets me discover then the hidden sensation, which could satisfy itself through the feared accident to the son. It is envy of youth against which the grown-up believes he has struggled manfully for a long time and it is unmistakable that just the intensity of the painful affect, when such a calamity really happens, releases such a repressed wish fulfillment for its mitigation."

This dream, reported by Freud as a sample of a dream of self-punishment, punishing the dreamer for illicit gratifications, is the reaction to painful dayresidues. It punishes the envy and death-wishes against the son, brings in the memory of an accident in early youth of the dreamer, caused by taking food by stealth, certainly an evidence of greediness on the part of the little boy. There are some surprising details: the exhausted son, who is growing old, seems to have a teeth-prosthesis, which Freud himself also had to wear after his more serious operation (1923).

Our assumptions for the development of this neoplasm are now: the injury on or near the lower jaw in early youth, the inveterate smoking, which the doctors blamed as the original cause of the neoplasma, the tendencies for self-punishment for envy, an oral character trait. The localization may thus become intelligible.

We turn now towards the problem of death-impulse. The ingenious conception of the imposing antimony, Eros and Thanatos, Lebens-und Todestrieb, was a product of the later years of the great thinker (1920). That the organism, the cell, should have a genuine impulse to perish, to die—shouldn't die from being consumed, was the most criticized aspect of this conception. The neoplasm, a phenomenon mostly of older age, shows cells of an intensive growth, but at the end they all die and kill the whole

organism, even in spite of the fact, that they have been operatively removed. All these circumstances may have impressed Freud, and the preoccupation with death may have strengthened the conviction. Here Freud had also the place to provide for the aggression-impulse, which he recognized in later observations. We read in "Civilization and its Discontents" (1930): "I no more understand that we could have overlooked the ubiquity of the non-erotic aggression and destruction and could have failed to concede to it its due position in the interpretation of life." Freud admits that for a long time he called sadism, what was only aggression-impulse and that he undervalued the importance of this latter impulse, which found its place now alongside the death-impulse and represents the principal cause of feelings of guilt. A famous discoverer in psychology confesses in his seventy-fourth year to have been mistaken! What tragic greatness in such a confession! Psychoanalysis became then more true and more—decent.

He who has seen Freud suffer through many years from the difficulties and pains of his mortal disease, may be allowed to postulate reasonable causes for such a misery destroying the old age of such a great, and till his end, productive genius. It was his wise experience that — if to cure isn't everywhere possible — to understand the origin is always worthwhile.

If these considerations result only in a stimulus to new investigations, I am satisfied. Are there connections between innate impulses and a disposition for a certain illness and the causes for death, a certain localization of an illness? What more is to be found of psychical and unconscious connections?

Let us finally point out two places in Freud's work, where, between the lines, he spoke about himself: "A man who has been the undisputed favorite of the mother, keeps for life the feeling of a conquerer, that confidence of success that frequently induces real success." And further: "The culturally most valuable character combines external independence and regard for the demand of conscience with a vigorous activity."

Freud's independent work and his magnificent discoveries prove his sublimation of a powerful activity together with never missing self-confidence. A human man with superhuman achievements! Absorbed in his Psychoanalysis the author has found the blessing of a life-work.

SOME PROBLEMS PRESENTED BY FREUD'S LIFE- DEATH INSTINCT THEORY

By GEORGE B. WILBUR, M. D. (South Dennis, Mass.)

Introduction

One of the problems very much to the fore among contemporary thinkers is an effort to think about thinking. Such an effort presents many difficulties whether it be approached from the purely logical point of view which considers the result of thinking in terms of a structure having a form possessed of certain invariant features, or whether it be approached from the standpoint of the psychoanalyst who considers the behavior of thinking as a manifestation of the instinctual tendencies common to all life. One of the difficulties arises from the necessity of using the results of thinking to characterize the process of arriving at these same results. This is a circular process which has as *one byproduct* unpleasant emotions. Many ways of attempting to avoid this circularity have been tried and found wanting. Presumably there is no way of succeeding.

The logician must accept what Sheffer has called the logocentric predicament which arises when the logician in attempting to give an account of logic must pre-suppose logic to do so. In psychoanalysis likewise if we would give an account of psychoanalytic theory as a theory to be considered from the point of view of psychoanalysis, we must pre-suppose the results of that way of thinking. Psychoanalysts have been aware of this problem from the first, and have in the main accepted it and dismissed it as something that must be ignored as of little consequence. Without having done this they could not have gotten started. In the main we must concur with this decision. Previous thinkers have, we may assume, consoled themselves with the notion that as long as no difficulties arose hindering further progress it would be safe to ignore this particular logical difficulty arising from self-reflectiveness. But we may not ignore the emotional difficulties nor the occasion for them. It constitutes perhaps our main problem as therapists.

The present writer wishes to raise the question whether such an occasion of circularity has not now arisen in the theoretical structure created by Freud. An adequate survey of this question would be a larger undertaking than we would venture to make with the means at hand. The present essay can only be a preliminary inspection of the field with the aim of singling out and stating some of the problems involved.

We conceive the problem to arise when a thinker endeavors to substitute a suppositional structure, a "fiction," for the concrete reality with which he began. We shall examine one such instance, or one aspect of it, in the case of Freud. We shall introduce illustrative material from the fields of logic and mathematics in an attempt to demonstrate that the problem is of general nature and not peculiar to any individual personality.

The thesis (or assumption) underlying our approach is this: there is in all life and all manifestations of life a common feature, exhibited in many apparently diverse ways. By proper analysis these can all be put into one category. This common feature may be an artifact due to the way the apprehending mind has to go to work. But even this is a demonstration of the very thesis. The thesis is: that this common feature is a tendency to maintain a characteristic stable form. This tendency may be called the "life instinct." That is a mere name, and from some points of view badly chosen because it is all cluttered up with rejected metaphysical connotations from the past. But it is the name given and so we will use it.

It is the further assumption that this tendency to maintain a stable form is threatened with disturbance by certain apparently quite accidental contingencies. They may arise within or without the form. In either case it is possible to regard this tendency to accident as a principle opposed to the life principle and to raise the question whether it is so accidental as may appear. If one wants to affirm this latter question, then of course it is natural to name it the "death instinct." The names are not important, but they may be misleading if used in such a way as to make us forget what they were called upon to label.

The paper starts out with several questions. No definite conclusions will have been reached by the end of it. But if the writer has made two questions to grow where was only one to start with, he will have been satisfied.

I

Freud's Life-Death Instinct theory was put forth with a good deal of reluctance and only in a very tentative manner. Freud himself felt very dubious about its value to begin with. For him it was simply a question of following out a train of thought put forth by others, more immediately by Sabina Spielrein,¹ more remotely by Rank and Stürcke. As we shall see in what follows it could have arisen eventually of itself in Freud's own theoretical system, as a result of considerations growing out of the concept of narcissism. As the problem first appeared on the horizon it seemed to be strictly a matter of theoretical difficulties. Perhaps some hidden inconsistencies in the theory as hitherto conceived were beginning to make themselves evident. Perhaps certain consequences and implications hitherto ignored were forcing themselves in from the periphery. Psychoanalysis was, perhaps, following out the precedent set by every preceding science: an initial theory assumed as the most convenient and simplest and nearest at hand, which had given good service, was beginning to show signs of being insufficient and inadequate. In any case it seemed a purely theoretical problem rather than one which had suddenly been forced by some new clinical observation.

What at first was for Freud simply an idle train of thought, a mere speculation followed out just to see where it would lead to, was certainly not expected to be a matter of any emotional consequence for him or for others. He returned to it several times and finally had to confess that, in spite of his original distaste for the theory, it had come to dominate his views. He went so far as to say he could not understand how it had been overlooked so long.

Freud's reluctance to accept the theory might be explained on the basis of the feeling that there is somewhere in it something

1. Freud, p. 70, *Beyond the Pleasure Principle*, refers us back to Sabina Spielrein: *Die Destruction als Ursache des Werdens*, *Jahrb. f. Psa.*, IV, 1912. Rank: *Der Kuenstler*, 1907; A Stürcke: *Einleitung by de vertaling von S. Freud. De sexuel beschavings moral*, etc. 1914. To which we may add Rank: *Der Doppelgaenger, Imago*, III, 97-164, 1914. The question with which Spielrein started, which was also Rank's, was: why does the sexual impulse have to overcome a resistance which can be called the fear of death? It is evident that the old Oedipus and castration complex previously brought to bear were not sufficient answer, as they were not for Freud later. This clinical problem was evidently only one manifestation of a larger problem. Perhaps the Oedipus and castration complexes were only the first manifestation of it. We will go into this whole question later in a historic survey which will follow this preliminary statement and consideration of the background.

wrong, some inconsistency previously overlooked. The theory of the life-death instincts seems to violate some psychological claim. It sounds offensive to the ears. Freud himself felt this and warned us that here as elsewhere the validity of this or any theory was not to be judged by the feeling of conviction or the lack of it aroused in us by the theory. These theoretical puzzles are not to be solved by intuition, he warns us, or rather they cannot be decided by intuition. Our intuitions and feelings about them are here also determined by the same unconscious something that made us develop our particular theory in the way we did. "My belief is that there everyone is under the sway of preference deeply rooted within, into the hands of which he unwittingly plays as he pursues his speculation."²

This attitude of Freud's to his own speculative ventures is closely parallel to one expressed by A. N. Whitehead in his preface to "Process and Reality." Whitehead there points out that since all constructive thought is knowingly or otherwise based on some assumed scheme of ideas, the only adequate thing to do is to assume such a scheme quite deliberately, and "unflinchingly" use it as a scheme in terms of which to interpret experience.

Freud's own attitude and emotional adventures with this particular portion of his theory are now being re-experienced by his followers. Some of them reject it in toto. It seems to them a chase after metaphysical will-o'-the-wisps and a departure from the tried and true ways of scientific procedure. Some of them, apparently, have even taken this opportunity to take permanent leave of psychoanalysis. Other analysts have, after an initial period of skepticism and doubt, finally reconciled themselves to the theory by some process of their own. Some have accepted the theory as a great philosophical contribution but one that has no practical relation to the world of clinical observation. No doubt, the attitudes and points of view possible to take can be indefinitely extended; and equally beyond a doubt, search would turn up exponents of such points of view. This would merely demonstrate again that what can happen has happened,—a matter of no importance at this point.

The foregoing material presents some interesting problems for the historian of science and of scientific thought, and for the student of systems of thought per se. In this latter category we can some-

2. Beyond the Pleasure Principle. p. 77.

times place the psychoanalyst who is confronted with these same problems as manifested and worked out in the individual patient. In fact it is quite possible to compare the structure of a personality or of a neurosis in an individual to a consistently worked out "hypothetico-deductive system,"³ and to view the neurosis as corresponding to the discovery of an inconsistency in such a system. One would proceed in some such fashion as this: take the empirical discovery that a neurosis comes about as the result of the sudden realization of an unconscious and repressed wish. Put the statement of this fact into the logical equivalent:

1. If so and so should happen, then such and such dire result will come to pass.

2. So and so has happened.

3. Therefore the dire result predicted is also going to happen.

There is a little hypothetico-deductive scheme in miniature. The first premise corresponds to the unconscious wish and the punishment it incurs; the second premise to the realization of the wish from without. The conclusion then corresponds to the outburst of anxiety which anticipates the predicted punishment. The subsequent neurosis, if we mean by this the symptoms which take the place of the anxiety, is the result of a conflict of the given system with another system in the individual concerned which predicates that there is some means of avoiding the dire consequences. The whole can be compared to the conflict of two opposed systems, or to an inconsistency in one large system based on several postulates.

The historian of systems of thought is confronted on the collective level with a situation that corresponds in many respects to the above in the individual. This has usually been viewed from the standpoint of the mathematician or of the mathematical logician who is not interested in the emotional questions that he turns up. He throws this material aside as irrelevant for his purposes. From the analytic standpoint this provides an opportunity. This discarded material is highly relevant for the analyst's purposes. The situation again has its parallel in the world of physical science and theory. Someone has said that what is death to a philosopher—the

3. C. J. Keyser's term. Cf. *Mathematical Philosophy*, Dutton, N. Y. 1922. This term will become clear in the sequel. The good word "theory" has we feel lost so much of its force for the average man that it is not sufficiently sharp for our purpose. We might also use the terms "theoretical system" or "system of theory" or "postulate set."

discovery of a contradiction—is an opportunity for physics. It enables it oftentimes to get out of a state of quiescence resembling death.

We have then to consider the question of how extensively the individual personality, particularly in its psychopathic manifestations, corresponds to the kind of processes the mathematico-logician studies when he becomes a historian of a theoretical system. Freud once saw that mythological conceptions of the world were "nothing but psychology projected into the outer world."⁴ Psychoanalytic investigators pursued this line of thought for a time and then seem to have allowed it to fall into a state of neglect. Some sporadic attempts have been made to extend Freud's view to other fields of thought. A most promising line of investigation which can be regarded as an extension of Freud's idea was opened up by Victor Tausk in his paper on the origin of the "influencing machine" in schizophrenia. There, it will be recalled, he showed that these mysterious machines are a projection of the patient's body and of its psychological state. So far as I know not many analysts have attempted to extend this idea to the normal man, although there is plenty of evidence that such an extension is justified. There are, of course, numerous papers dealing with various limited aspects of this large problem, but so far as I know no effort at a systematic and detailed analysis of the possibilities of the extension of these ideas to the world of theory construction in general. In what follows we shall make an attempt at a preliminary survey in this direction. Our material will be provided by the emotional difficulties spoken of above, but long before we can arrive at a point when we can really begin to discuss such questions it is necessary that we have some acquaintance with the logical structure of psychoanalytical theory itself. But this requires some acquaintance with the nature of logical activities, and since analysts are presumably not extensively acquainted with the results of recent investigations in the field of logic and the construction of systems of mathematics, we shall have to have a look at these.

At the very start of psychoanalysis Freud "framed a scheme of ideas," to use Whitehead's phrase, or a "hypothesis" as it is more commonly called. Freud called it a "fiction." With this "fic-

4. *Psychopathology of Everyday Life*, MacMillan, N. Y. 1916. p. 309.

tion" he proceeded to explore the world of clinical experience presented by his patients. Modifications in the fiction resulted, but we are familiar with the fact that they were always extensions and enlargements of the original fiction until it became the imposing structure of theory that we know today. This fiction was based on certain initial presuppositions. In the first place patients were suffering from a conflict, so the scheme had to provide for a duality of something that would produce this conflict. Eventually this duality came to be represented by or embedded in the life-death instincts by ways which we may be able to consider later. In the second place, since psychological phenomena were for Freud, given his biological and medical background and predilections, clearly an extension of phenomena to be found on lower more strictly biological levels, it was required that one of his basic postulates be some fundamental biological principle. This he found in the "stability principle." We do not know that he took this over from Fechner, as might be inferred from his subsequent comparison (1918) of his principle with the Fechner statement of its relation to the pleasure principle. We shall find reason in what follows to raise the question, but perhaps not the means to answer it. In any case Freud took from somewhere an undefined "tendency to maintain stability," and such a principle is in conformity with present day biological thinking, as I propose to show.

The modern concept of the "stability principle" will constitute the subject matter of our second problem. Having reviewed the use now being made of the stability principle in modern biological thinking, we shall return to a consideration of the Freudian fiction and the relation of the life-death instinct theory thereto. We shall hope by that time to be able to cast some light on the choice of two alternatives. Either the Life-death theory is something new and foreign to the initial starting point and hence perhaps inconsistent with it, or else it is contained in the starting point in some hidden form. If the latter alternative be true, then Freud had only rediscovered with surprise and distaste something he had started with,—although unwittingly.

It may turn out that the solution of this difficulty of choice may turn on a much more refined logical analysis than we can give by means of our ordinary logical techniques, which are pretty rudimentary and productive of many fallacious results. A thorough-

going logical analysis such as that to which mathematical systems are subjected requires a technical apparatus and the competence to work it that neither I nor probably any of my readers are likely to possess.

Formal logic may be looked upon as a kind of game played with a limited set of counters according to a specified set of rules stated as fully as one knows how (apparently this is never full enough). These rules provide ways in which the counters can be manipulated to form sentences (propositions). The counters are of two sorts; variables, blank spaces, names to which meaning is to be given eventually; and the logical vocabulary, words, or symbols which express such notions as: "if. . . then. . .," "and," "or," "not," "some," "all," "implies," "leads to," "equals," "is included in," "can be substituted for," etc. Of course they are endless in number. They represent operations or relations. In any given logical system the game, or we might say esthetic ideal, is to use the least number of such operations possible and to construct all the others required from these. With these materials one constructs statements such as "All () is ()," or "Some () is ()." These statements in turn can be represented by letters, e.g., p, q, etc. Now one can build more complex statements such as "if p then q," which in an expanded form would read: "if the statement p is true then the statement q is true."

The game is to start with as little as possible which of necessity is undefined, define in terms of this limited given what more is necessary, and then to see in how many ways one can contrive statements and forms of statements, theorems, which are "true" and "false" just by virtue of the *form* in which the statement is made, and completely irrespective of the meaning or names one gives to the variables represented above by (). For example, taking the important form of statement discovered by Aristotle (one of many): "If every A is B, and C is an A, then C is a B." This statement is true no matter what A, B, C may mean. It is customary in elementary logics to fill in the blanks in this statement thus: "If every man is mortal, and Socrates is a man, then Socrates is mortal."

This is all very simple and obvious, perhaps trivial, to the non-logician. But it does not take long to demonstrate that it is not quite so simple as it may seem. Let us fill in the blanks thus: Peter and Paul were apostles. The apostles were twelve. Therefore Peter and Paul were twelve.

Filled in thus, this form no longer looks like a self evident truth. What is the trouble? Of course, the statement is no longer in the hypothetical "if. . . then. . ." form. But that makes no difference, as can be seen by supplying those words. Not to prolong the discussion, it may be stated immediately that the trouble lies in the word "were." It is not the same word in each of the sentences, or at least it has not the same meaning even if it has the same sound. The verb "is" is a very ambiguous word. It has at least four different meanings: "is the same as," "is a member of," "is contained in," "has the same property as," "can be substituted for," "has existence," and so on. Substitution of the proper meanings for "were" in the place of "were" in the above sentences, then makes a set of untrue statements into true ones.

This example may serve to illustrate how logic can be useful in the construction and criticism of a calculus. In a science like psychoanalysis where it is not the form of the statements that is important so much as their content, it may play a part in the statement of results but would seem to be of no use in the process of their discovery. We may find reason in what follows to modify this statement.

The formal structure of any science then, so far as it can be put into systematic logical form, would consist of a set of postulates specifying the nature of the subject matter of that science, one or a few basic relations between the objects that constitute the subject matter, and some rules for operating on these objects in the given relations to form other relations or statements of relations, being given a limited number of statements that are true (by observation or by assumption). Now this starting point consists of materials that are a matter of choice which is limited only by the consideration that one wishes to have as limited and as simple a beginning as possible, but one which will yet be fruitful enough that the rest of the findings of that science can be derived from this beginning.

So far the task of providing such logical substructure for a science has never been completely carried out, so far as I know, except possibly for some branches of mathematics. The logicians are very far from being able to supply such postulate sets for the purely experimental sciences. The curious situation exists that

while in some respects logic is one of the oldest of the sciences, it is at the same time one of the youngest. Because of its recent tremendous growth after 2000 years of comparative stasis, we might say that it is even younger than psychoanalysis.⁵

This very brief and inadequate account of the nature and construction of a postulate set will perhaps suffice to give a slight feeling of familiarity to some of the words we shall have to use in what follows. But it will also serve to bring out another point, which we will state here and drop until the very end of the third section of this essay. What I wish to stress is the quite obvious fact that in representing the postulate set above, I have had to use language to do so. A little consideration will show that this language is already a logic in a sense. The situation is then that I have had to use a logic to state a logic; one is embedded in the other. Attempts have been made to avoid this situation, to state a logic completely within itself. They have so far failed, and it is my impression that this has been shown to be necessarily so.⁶ The result is that any given logic is one member of a hierarchy; it cannot stand alone.

This game of constructing empty forms which are nevertheless true, or are true just by virtue of their form, will interest us below in other connections. There we shall be interested in empty forms, in a somewhat different sense of the words, and in their existential or material relations, not in their truth values. Here our interest is confined to the fact that this kind of game as played by the logicians provides the simplest possible example of what any scientist or other thinker does who tries to construct a theoretical system. The game is far from being as simple as it might appear to be from these beginnings.

We shall let this brief word suffice as to the logical aspects of our problem, and proceed to questions of giving meaning to the () in our logical forms. We shall proceed to the field of mathematics and have a look at certain aspects of this, again leading to questions of psychopathology. If we are thus able to dismiss so briefly important topics, it is because we feel that we are going to

5. Those who wish to look more extensively into the topic will do well to consult "Mathematical Logic," by W. V. Quine. Norton, New York, 1940. Besides giving a clear and easily comprehensible account of the present status of the science, it gives also the best historical perspective of the genesis of recent developments known to me.

6. *op. cit.* p. 316.

meet them again and meet again the particular phenomenon that interests us.

The analyst is sometimes inclined to regard the individual interested in such abstractions as logic and mathematics, as an individual who has fled to a world of substitutes, and away from the world of living reality. In a sense this is true.⁷ And if it was the purpose of this flight to escape certain things in the world of "reality," in particular certain emotional dangers, then it is equally certain that the purpose is vain. For the very emotional difficulties that one sought to escape have a way of returning by the most unexpected route. We have thus something corresponding to the "return of the repressed" that we used to hear so much about in psychoanalysis.

But it is also true that one is not necessarily seeking to escape anything. Rather is one wishing to create a substitute for a vanished or unavailable something, a simulacrum, a symbol, which is not a mere representation but a substitute with which one can do what he formerly did to the object symbolized and no longer available. If one wants to state it so, this process of substitution has the aim of reinstatement of a former condition of affairs. But to be successful, the substitute must have what the ancient Chinese sages called "spirit-resonance." It is recorded of Ku K'ai-chih (cir. 344-406 A. D.) that he was such a master of this power that when he had drawn the portrait of a girl who had resisted him, and placed a pin in the heart of it, the girl fell ill. She recovered when he had removed the pin.⁸ Here is "spirit-resonance" to a supreme degree. Nowadays we try to achieve this in our systems of theory.

Where the ancient Chinese achieved a substitute by way of a painting or drawing, the modern individual we are considering tries to do so by constructing a theory. If this theory has "spirit-resonance," it will work; it will tell us things we are going to find

7. A similar point of view, expressed from the standpoint of a mathematical logician, can be found in "The Logical Structure of Science" by A. Cornelius Benjamin, London, 1936, p. 198. There he points out that science talks about things that obviously exist, in terms of things that do not. Again on p. 316 he speaks of how the explanation comes to take the place of that which it explains, so that the explanation becomes the reality and the former reality comes to seem unreal and fictitious. His further comment that when we have explained anything we have explained it away, should be of interest to the psychopathologist.

8. I owe this term and the tale to "The Chinese on the Art of Painting" by Osvald Sirén. Henry Vetch. Peiping, 1936. p. 12.

before we have found them. Sometimes it will even tell us where and how to look for those things we have not yet discovered. It will also tell us of things that do not seem to exist and which it seems impossible could exist. Things we won't like and will refuse to believe in. We may even try to destroy our theory because of such things, and will feel that in so doing we are committing suicide, or murder. It will seem strange that we can become so worked up over something that is after all only a substitute, a makeshift perhaps, of which we avail ourselves for want of something better. It is this curious emotional state of affairs that constitutes our first problem. Since we are not trying to analyze Freud the man, we shall not examine it in the case of Freud and his particular theory. Those who are inclined to pursue this line of thought will find some further material in Sachs' paper on Freud and Moses.⁹ For our purposes here we shall make use of some illustrations taken from the field of mathematics.

These parallels will have also another purpose for us. They will represent phenomena in a collective field which are similar to the individual phenomena we encounter in the psychoanalytic field.

Whitehead has pointed out that in criticizing the philosophy of an epoch, if one ignores the points that it is felt necessary to defend, and seeks instead to work out the unconscious assumptions made by the different systems of philosophy in that epoch, there will be discovered some common presupposition. This will be so obvious that it will be completely overlooked by the thinkers in question and will be so fundamental that all the apparently different systems of philosophy in that epoch will be really only variants on one system.¹⁰

Because of our educational system, whereby we only become acquainted with mathematics in relation to its quantitative and metrical aspects, and therefore usually do not come to realize that these aspects do not constitute the real essence of mathematical procedure, it will come as a surprise to many when I state that the psychoanalyst in carrying on his therapeutic work is behaving in some respects like a mathematician. We may assert that the procedures followed by the mind in constructing and dealing with mathemat-

9. The Man Moses and the Man Freud. Hanns Sachs. *The Psychoanalytic Review*, 28. p. 156, January, 1941.

10. *Science and the Modern World*. A. N. Whitehead, New York, 1925. p. 69.

ical systems have also been followed in constructing and dealing with any kind of theoretical system. What went on in thinking mathematically also went on in thinking anything whatever.

The appearances are so much to the contrary that this last statement needs some qualification. A well written mathematical book today begins with an explicit statement of the things given to start with, rules for manipulating these initially given objects, etc., as stated above, and rules for manipulating the statements which specify how the objects may be manipulated. If it is an abstract mathematical theory about a closed and self-contained universe, one is also given a general statement of the totality of the possibilities in that universe. The game is to work out the details of how many ways this totality can be stated. Since everything is known to start with, one would not expect anything new to develop. Curiously enough it does somehow, a fact that was of great interest to such a mathematical philosopher as Royce and one which he never succeeded in explaining. Nor has anybody else. In an applied mathematics which is usually a sort of physics, as, e.g., geometry is now considered, the totality of objects is not given. But when new objects are discovered they are subject to the given rules. The main point I wish to bring out is that in mathematics everything is stated to begin with as explicitly as one knows how. But in the last analysis this only means that one states as fully and as explicitly as one knows how the way in which the mind of the manipulator of the objects is going to proceed, the kind of ideas he is going to be able to form, what things can be substituted for others and under what conditions, etc.

How does thinking proceed in such a science as psychoanalysis? Probably by exactly comparable ways, only they have not yet been stated very explicitly. In a sense they are still unconscious. In a later portion of this essay I shall return to this topic, and try to show the as yet crudely stated mathematical structure of psychoanalysis. It would be possible, following out the line of thought being developed here, to say that the mathematical-logician is really engaged in psychoanalysis in that he is making conscious the unconscious ways the mind thinks. We shall return to the matter of playing on words and find some matters of interest there.

At this point we are interested in how the analyst confronted with a patient proceeds. It would be possible to compare his work

to that of an engineer, let us say a bridgebuilder. The latter has his abstract formulae giving the stresses and strains in any structure he may want to build. He has his tables of strengths of materials, etc. All this material will give him the rules for building any bridge. But he has to build a particular bridge at a particular spot, and there are here some factors not given in his initial formulae and tables. His general abstract rules must be made specific to fit the conditions that hold at this particular spot. The analyst differs from the engineer only in that his book of rules and tables has yet to be written, for the largest part. He has only the merest beginnings.

A patient presents himself, and it is soon obvious that he has a castration complex. That there is such a thing as a castration complex, and that it has an etiological relation to many if not all neurotic conditions, is a hypothesis now so well established that it may be taken for granted as a fact in any patient. The pioneer work of Freud and others has established the hypothesis as well grounded. But the term castration complex is an abstraction. It does not mean, it neither denotes nor connotes, that our patient has lost his testicles or his penis, and is having emotions about this. It does not even mean that he consciously fears the loss of these parts. And any analyst who tried to tell a patient that this was the case would be wasting his time. No, this term is an abstraction, a name, denoting the loss or fear of loss of *something essential* in the complex entity that constitutes that particular individual's sexual drive. As is usually the case, the term was arrived at by a process of metonymy, of substituting a part for a whole. By a familiar semantic process a name initially denoting a concrete something comes to mean a whole abstract class of things. In the case of our patient, analysis has the task of discovering the particular and specific concrete meaning that this abstraction has for this particular patient. The name must be filled with a specific meaning before the statement becomes true. The meaning when discovered will be unique. It will probably not hold for any other individual. It will be based on that particular individual's make-up and history. In general respects it may be like some other individual's meaning, but for analytic and therapeutic purposes this is not sufficient. Its specific individuality must be discovered and dealt with. Therapeutic analysis, or the thinking that goes with it, has the task of giving a specific meaning in a particular case to a term that represents an

abstract but unspecified variable. Analysts, as I say, would not think of this procedure as in any sense mathematical. Let them then think over the remarks of the great French mathematician Poincaré, who said: "Mathematics is the art of giving the same name to different things." If analysts are not willing to admit that this is what they do, their opponents have certainly not failed to bring this as a reproach against them. Perhaps that is why analysts have felt called upon to deny the charge. In any case we are going to see that the history of mathematics shows it to have developed along lines exactly comparable to the just described analytic manner of thinking. The differences between the two are not in the manner of thinking, but only in the subject matter. The one is at the mere beginning of its historic development, the other has behind it countless thousands of years. We may suppose that what has been the history of the one manner of thinking is going to be the history of the other. One sort of event which has repeatedly characterized the history of mathematics we can now see in process in psychoanalysis.

In the course of giving specific meanings to the abstract variables that are terms in our hypothesis, we shall likely come upon an interesting state of affairs. If we have started with a hypothesis that seems to be true on general principles, and one which we should expect to continue to be true when the variables are given the concrete meanings they can take, and if in the process we should eventually come on a meaning that seems to be impossible or contradictory, or one that makes our hypothesis appear to be nonsense, we may be surprised and will certainly tend to be disappointed and displeased. In such a case we will be tempted to declare this particular value of the variable an inappropriate one, — or something of that sort. Or we may go back to the original statement of the hypothesis and judge it to have been poorly stated in some respect. And so we start over again. As I shall expect to show, something of this sort is what happened to Freud when he came upon the Life-Death theory. In the meantime we will see how it looks in the history of mathematics.

The history of mathematics is full of instances of the sort of situation I have been discussing in general terms. A concrete illustration will be illuminating. We can find one that does not require much mathematical knowledge, and that is in fact known

to most people. It requires only to be refreshed in their memory.

Presumably mathematics began as a gesture picturing a situation in the outer world. On one's fingers a state of affairs was represented. As the expression runs, the fingers were placed in one-to-one correspondence with a group of things in the outer world, — let us say, a group of sheep. This placing in one-to-one correspondence is the familiar process of counting. It is a process of symbolism. The point for us is that by a process of substitution, of representation on his own body, man could more easily picture to himself something in the outer world. The history of this process is now irrecoverable, but by a process of extrapolation from later stages and from other fields we may surmise with some degree of conviction what must have happened in the very beginning in mathematics. We can reconstruct the early stages of this line of development and see how it may have gone. Once having found that he could so represent on his body one aspect of the outer world, man was able to continue and extend the process in his own body. It became somewhat independent of the outer world. I qualify this independence because the fact that man had only a limited number of fingers and toes seems to have acted as a limiting condition that for a long time prevented extension of the counting process. But even with this limitation it had become independent of the outer world and acquired an autonomous existence. Counting by a process of hypostasization became mathematics, which dealt with things, numbers, that existed in their own right. They did not exist in external reality, nor were they something that existed only by virtue of human psychology. They seemed to be only in the mind, not of it. It is also worthy of note that while the original sheep might disappear, the symbol that substituted for them did not. It persisted and was an invariant."¹¹

Eventually man discovered that by marks on a surface he could represent his fingers. All that we know about the early history of mathematics dates from this time. But with this step, which occurred only after an indefinitely long time, the mathematical process became really independent and began to roll ahead of its own weight. Over and over again an event occurred that concerns us as psychologists. For long ages man was content to proceed in some such fashion as this:

11. Weyl: *The Mathematical Way of Thinking*. Science, Vol. 92, p. 438-446, Nov. 15, 1940.

Beginning with his left thumb, let us say, as one mark I, man could add the next two fingers I, I, to obtain III and so on. Or he could, as he eventually discovered, reverse the process and take away I plus II gave III. II taken away from III gave I.

This was wonderful magic, and man was happy to generalize, hypostasize, and extend the process as his wants progressed. He was happy, — that is, until he came across the poser of trying to represent what happened when he tried to take III from III. This difficulty was eventually solved by the invention of the 0 concept and of a mark to represent it. We cannot understand today why this should have been so difficult a concept to discover, but what we can judge from its known history shows that it must have been. It is not essential to follow out in detail the whole process of the invention of mathematical symbolism. It can be summed up as the extension of the discovery that by adding one set of marks to another, a third set was obtained which was nothing but a restatement of the first two marks; it was only this and nothing more. This may sound like a triviality, but it was one of the most profound discoveries that human mind has ever made. One of the most interesting and perhaps influential books of recent times, a very profound philosophical book, is devoted among other things to the re-discovery of this "trivial" fact. I refer to Wittgenstein's "Tractatus Logico-Philosophicus." It is hard to see why such a simple fact should be so significant. I plus IIII gives IIII; this is obviously a tautology. But 1 plus 4 gives 5 is not so obviously a tautology. This simple change in the calligraphy has sufficed to hide an important point. We will see in a moment that man was able to believe that he got a great deal more than he had started with by this process of adding one thing to another and getting a third thing of the same sort. We can represent this abstractly as:

a plus b gives c.

The letters stand in the first place for any numbers that satisfy the relation, and in the second place for any objects that can be numbered and added, one to another, to produce a third. Not everything has this additive property. It took a long time to perfect this way of representing a process.

The 0 concept represented a great difficulty. In exactly the same way the concept of a fraction and of a minus quantity represented

similar difficulties when the process and the symbolic representation of it had been extended to cover situations of fractionating and indebtedness. But we may guess that this process of extension would never have occurred except for the invention of the symbolic process. If man had had to deal only with sheep, let us say, it is entirely possible that it would never have occurred to him to try and take three sheep from two, nor to divide two sheep into three. As to all this we cannot say with certainty. I am passing very lightly over tremendous difficulties. If this were a history of mathematics instead of just a briefly suggested possible one leading up to the exhibition of some emotional eventualities that arose later in the course of it, for which we have some recorded history, what I am here putting into a couple of words would require thousands. Our interest is in a bit of psychopathology to which we are eventually going to arrive, only incidentally in the history of mathematics. But the psychopathology can only be understood when it is realized that the significant event violated or appeared to violate some of man's cherished unconscious assumptions.

To return to the invention of the symbolic process, we only know that man did somehow contrive it and that it in turn did, of its own inherent properties, suggest situations that in the beginning struck man as highly unreal and fictitious. Mathematics has for the average man never lost its feeling of being both a queerly magical process and also quite a fictitious one. So when the symbolism first suggested the necessity of picturing a non-existing state of affairs by a mark, that is by something existing, this seemed an inconsistency. How was it possible that something that didn't exist and couldn't, could be pictured by something that did? The very mark 0 as a physically existent thing seemed to say that the non-existent was existent, that non-being had being. Even yet people have difficulty in thinking of 0 as a number like any other.

It is now apparent to mathematicians that throughout this process of extending the application of the symbolism man was always proceeding on the quite unconscious assumption that if one number be added to another it would give a third number and only a number. It is also apparent that man felt (i.e., unconsciously assumed) that there was no limit, or should be no limit, to this process. Hence his surprise and consternation when his calculations produced something that could not be recognized as a number like

any other. Such queer things, for instance, as zeros, negative numbers, fractions, the infinite, and so on. Man's activity predicated the existence of something that did not seem to exist in reality. How could this be and what did it signify? Out of the attempts to explain such situations, which did not occur only in mathematics, as we shall see, grew the doctrines of metaphysics. Eventually a rational meaning was found, that is, a way of extending the symbolic process, or the process of calculation, and the mystery disappeared from the subject. The new kind of number took its place alongside the old numbers and man felt a kind of relief. We can now see that this feeling of relief signified that man could feel that his unconscious assumptions, his presuppositions, were justified and need not be revamped or given up for others. He heaved a sigh of contentment that everything was all right with the world, and as it should be.

This history is presumably known in some fashion to most of us. In our own re-discovery as individuals of the process of counting, and the development of arithmetic from it, we have recapitulated in ourselves some of these positions taken by the science of mathematics. And let me add here that in using this word "recapitulation" I am not intending to imply or to assume any such law as Haeckel's law of "biogenesis." It seems an uncalled-for elaboration of the obvious to dwell on these historical matters. Possibly for this reason one passes over much interesting material presenting many emotional and psychological difficulties. Here we are reminded of Whitehead's admonition to investigate the "obvious" if we would find the real meat of the situation. It may be said that the history of mathematics is a perfect gold mine for the curious psychopathologist. Here we will continue to follow out for a moment our bit of history.

Taking the equation given above, in the more usual form given it in algebra, it serves to ask many questions.

$X + 1 = 2$ asks the question: what, added to 1, will give 2? The answer is clearly 1.

Likewise:

$$X + 1 = 1 \quad X = 0$$

$$2X + 1 = 5 \quad X = 2$$

$$X \cdot X + 2 = 6 \quad \text{or written in its more customary form} \\ X^2 + 2 = 6 \quad X = 2$$

And so we could proceed indefinitely. This is nowadays all very familiar and obvious and we know there is no limit to the process. But that was not always the case. Our feeling of security in handling these simple ways of asking questions is based on a long history of solving what were exceedingly difficult problems when first presented. Eventually man got around to asking himself what X could mean in the question:

$$X^2 + 1 = 0$$

and the answer called for by the rules which had hitherto held good, the square root of minus one, $\sqrt{-1}$, obviously could not be an answer; or if it were an answer, then just as obviously it was an answer to an improper question. For nothing was more certain than that a negative quantity could not have a square root. As the Hindu mathematician Bhaskara pointed out in the 12th cent. A. D., a negative number cannot be a square and hence cannot have a square root.¹²

If I remember rightly this was still the belief among the High School teachers when I began to study algebra. And may yet be, for all I know. The great mathematician Euler stated in 1770 that such expressions as $\sqrt{-1}$ were impossible or "imaginary" numbers, since they were neither greater nor less than nothing and hence necessarily could not exist. Some years later Leibnitz was moved to speak very poetically of such expressions as the "sublime outlet" of the Divine Spirit.¹³

But by 1831 it had begun to seem that such expressions, while they might still be called "imaginary" and might still seem to be an empty play upon symbols, were not at all impossible and were in fact very useful entities. So Gauss expressed himself in that year.¹⁴

In the sixty years between the two attitudes expressed above the mathematicians had found a way to assign an objective existence to an "imaginary being." It was really very simple. It was found that the symbol did not refer to an object but to an operation, to something that one *did* with objects. The process of counting had long been associated with a process of passing back and forth

12. Cf. Dantzig: *Number*. 3rd ed. MacMillan, 1939. The following references are also from this source.

13. *Op. cit.* p. 204.

14. *Op. cit.* p. 190.

along a straight line. (1) meant a step in one direction, say to the right. (-1) meant a step back to the left. Thus numbers could be taken to mean activities and not objects. This elementary association of arithmetic and geometry had given rise to the foot rule, the origin of which is lost in hoary antiquity. When it was discovered that the symbol $\sqrt{-1}$ could be taken to mean not a passing back and forth along a line, but a turning of the line itself so that it became perpendicular to its former position (that is, the symbol indicated the operation of taking a step at right angles to the former path) the way was opened for the acceptance and further use of such symbols. Out of this use came the huge superstructure of modern mathematics.

In the years that have followed, this particular symbol has become one of the most useful tools that the human brain has ever devised. It is hardly an over-statement to declare it the foundation stone of all modern engineering and physical science, in their mathematical aspects. For one thing, the interpretation made it possible to pass at will from algebra to geometry and back again, thus bringing together two apparently totally distinct sciences and making possible the modern scientific point of view whereby everything is described in terms of and with reference to its space-time features. Anyone who cares to follow this very interesting chapter in the history of human behavior will find an excellent elementary account of it in Dantzig's book.

The important point about all this history for us as psychopathologists is easily stated now, — after thousands of years of struggle with what seemed to our forefathers horrible hobgoblins. Man has the habit of stating in words what he is going to do about something or other. But he has had the curious belief that everything in such a statement has an objective existence as a material object. Has had, I say; often times still has. We will have a look at some of the consequences. But let us be clear in our minds as to what goes on.

Man invented counting, an activity. He found a way of picturing what he did, first as simple strokes on a surface. This, we have surmised, represented what he did with his fingers. It is clear that in the course of time man forgot this history. He began to believe that God invented all this, or at least that the things represented by the strokes had an objective existence. Well, in a sense that was true.

When the strokes represented fingers or sheep or other objects, they did have a real existence. But when man named the process of placing the strokes in correspondence with the objects, he was not naming objects but operations, activities of the mind and body. These he called numbers. And eventually he also tried to believe that these had objective existence aside from the means chosen to represent them. One can call these things "fictions." Even as late as Kronecker, who died in 1891, it was still possible to state seriously that God had invented the integers. The rest was the work of man.

As psychoanalysts, we are curious as to the distinction. We are here in danger of getting involved in very deep philosophical questions that plague our contemporary thinkers. We had better retreat to the past to some examples that show a little more clearly something of what took place.

Man writes down what he does, formulates it in a sentence. At first concretely as pictures, then more and more abstractly until his formula is very far removed from anything he can see in the world around him. It begins to be "fictitious." Later men come along, or the same man on a later day when he has forgotten what he meant on first writing down his formula, who have the task of trying to discover what the abstraction, the "fiction," meant. It may be forgotten even that the formula originally said that somebody was going to do something, or had done something to something to produce something. These "somethings" are all blanks, even though they be named. The second comer has the task of filling in the blanks with concrete meanings, performing what the mathematician calls making an interpretation. If he does his task well the empty formula takes on meaning and becomes sensible. Interpretation consists in the act of substituting specific concrete meanings, usually taken from the world of objective reality but not necessarily so, in the place of the blank spaces, in the place of the variables. When no such objective concrete value appears to exist, we are nevertheless constrained to feel that there must be such a value somewhere. We are confronted with the task of finding it. We are not satisfied to believe that there cannot be somewhere an appropriate meaning that will not "satisfy" the formula. If the formula has been well constructed its very manner of formulation seems to say that it cannot have only a limited application. It gives the feeling of be-

ing a universal truth knowing no limitation of time or space. So if no satisfactory value lies close at hand, the mind proceeds to invent one,—to imagine the kind of value that ought to appear. Even this does not satisfy the formula,—that is, ourselves. If the value does not exist in the objective world, or seem to do so, we proceed to create it or its simulacrum out of hand from the materials lying about.

Sometimes the value or satisfying entity, so created out of hand or as the result of mere mechanical extensions of the scope of the formula, produces values or applications to values or to entities that otherwise seem to be impossible. Such entities may not and cannot exist (so it would seem) in the world of reality, nor in the much larger world of logical possibility,—*as conceived at that moment*, it is essential to add. Still, they might be true of the world of the supernatural. The fact is that some things appear to exist against all our reasonable expectations, an appearance that is given simply by the fact that some unreasonable things seem to be values that satisfy old time tested "fictions."

We have neglected to state a most important consideration. What we have said to happen could not happen so readily except by just the same sort of neglect we have ourselves committed in failing to point out something. We shall consider in a moment what occurs as a result of this neglect. The statement above, about a fiction being a blank statement, could have been put thus:—a fiction is a blank check in which we have to fill in the blanks. Such a check is worthless unless it bears on its face a statement of the name of the bank in which it would be good. Forms are not good in any world,—only in specified worlds. So our logical scheme needs to state as its first assumption some postulate relative to its universe of discourse. Neglect of this point, the leaving of it unstated as something that can be taken for granted, results in curious bits of reasoning, as we shall see. It took some 2000 years since Aristotle's discovery of the syllogism to make the discovery that much of the bad metaphysics and philosophy that had occurred in the interim was due to failure to state in what world the form was valid.

We can illustrate this by reference back to the analyst confronted with the patient who is suffering from the castration complex. The patient has told the analyst something which the latter can reduce to this particular form,—the castration complex. The

only question is, where and when is this form valid? At what level of infantile psycho-sexual development did the castration threat occur? The patient has stated it already, but in an implicit way only. The analyst can make no sense out of it, for the statement might refer to many levels. The statement has to be left to one side while the patient's life is painstakingly gone over bit by bit. After considerable investigation, quite by surprise the patient and analyst discover what the trouble is, in what world the original statement is valid, and are astonished to find that that is what the patient told in the first place.

The analyst is familiar with the old Freudian statement that the patient is always right, but this statement is of no use since it gives no way of knowing how the patient is right. The original statement was correctly formulated, but misapplied as to universe of discourse. It had not been properly interpreted. The prolonged investigation in the meanwhile has supplied the correct interpretation, told what world to look into for the specific value that makes the formula valid. Here we may draw the parallel with the situation quoted above from Whitehead. If patient and analyst both make the same unconscious assumptions they will not discover the proper universe of discourse, the field or level of infantile sexuality, that displays the abnormality. For if to both of them the given abnormality is a something taken for granted and hence seemingly normal, it will be overlooked. What everybody does will seem the natural thing to do; hence it will present no problems to the observer, who has been subjected to the same influences during his own upbringing. Not even the recognition of the principle that whatever persists does so at the expense of other potentialities that were shoved aside, is of any use here. The logician is in a somewhat better case, for with his limited and completely known beginnings of things he can start from an exhaustive statement of every possibility. One of his initial postulates, incidentally, is a statement specifying which of the many possible forms of statement is given to start with. But in the case of the human being we have yet no way of giving an exhaustive statement of all the possibilities. We have to discover from the results what was initially given and have not the aid of knowing how many possibilities this is a selection from, nor are we much better off as to knowing from which level of development things started to go wrong.

To come back to our world of mathematics. Some reference

has already been made to the kind of emotional response with which the professional mathematicians meet the situation created by the sudden intrusion of an apparently impossible meaning into an old familiar fiction. Material has been cited to show their reluctance to accept the situation, their mild expressions of horror that it should be so. But these people have stayed within their proper universe of discourse. I propose now to cite some other material of perhaps more interest to psychopathologists. This arises from transposing the formula into another universe of discourse. Such operations provide wonderful opportunities for the lunatic fringe as well as for the philosopher. Whenever such an occasion as the discovery of $\sqrt{-1}$ arises in the course of application of an old formula to new entities, it is necessary, of course, to give the new entity a name. Such choice of name is not always dictated by well considered reasons. For the careful theoretician the name is a mere convenience; it means for him the properties defined by the way the symbol or entity to which the name applies relates to the system of which it is a part. That is, it is a convenient label to apply to something determined by the formal context in which it occurs. But for the lunatic fringe, the believers in the occult and mysterious, the name itself without its proper context becomes suggestive and fitted to their purposes.

Such an opportunity was provided by the concept symbolized by $\sqrt{-1}$ and by a name given it. It was called by Descartes an "imaginary" number, a misleading name which still sticks to it. This entity has curious properties. By certain manipulations it (the "imaginary" number) produces "real" numbers. The "unreal" generates the "real." This was something too good to be missed. H. Stanley Redgrove, an English writer on occult and alchemical topics, published in 1912 a book entitled "The Mathematical Theory of Spirit." It put forth this thesis among others:

Since a "real" number cannot by any process of manipulation generate an "imaginary" quantity, whilst an "imaginary" one can generate a "real," it therefore follows that this process in mathematical symbolism is peculiarly fitted to picture the relations between the spirit world (he means spook world) and the real world. The real world cannot give rise to the spiritual one but the spiritual can cause the real. Here again one's emotional acceptance or rejection of this idea will depend on the interpretation given

the word "spiritual." Mr. Redgrove's thesis can be given an interpretation, a twist, that makes good sense. He, however, took it to mean that dead bodies could not give rise to spooks, but that spooks could re-animate dead bodies. He believed in clairvoyance and other such marvels. He was clinging to an old meaning of the word "spiritual."

Here is another instance from ancient times. Occult tradition has preserved a tale of marvels which it fathers on Pythagoras. He is said to have founded a mystic fraternity on the strength of the magic powers of the pentagram, the five-pointed star. Even today this is still a symbol of great importance in the world of occultism. Everybody is familiar with the fact that if the alternate vertices of the five-sided regular polygon (the pentagon) be connected by lines drawn, a five-pointed star (the pentagram) results. This contains in itself again the figure of the pentagon one started with, formed by the intersections of the connecting lines. If in turn the sides of the pentagon be extended in each direction, they intersect the extensions of the alternate sides and again form a pentagram. Thus the one form is transformed into the other, and this in turn back into the first. However long continued, only these two figures can result; they differ in size, and the points forming their vertices constantly change their identity, i.e., their location. But two things do not change: are invariant under the transformation, to speak in mathematical terms; there will always be 5 sides and 5 vertices. By this particular extension of the lines, there is no possibility of obtaining from this figure any other kind. This is an early and simple instance of a kind of process that one can carry on in the manipulation of symbols or figures. The study of such transformations has become one of the most important branches of mathematics. By means of the theory of transformation a sort of dynamic quality has been introduced into a science — geometry — which had seemed to be the science of the static and unchangeable. It is easy to see that the theory of transformation and invariance under the transformation is most eminently suited for the description of this world of constant flux in which we live, in which yet some things seem never to change. The facts of evolution, for instance, can be most readily described as such a process of transformation and invariance under it. There is no apparent limit to the application of this theory. We shall come back to it

below. At the moment I am only concerned to show that the occultists who are not mathematicians in any sense but who always seize upon the wonders of mathematics for their own purposes, also saw this point about the transformation of this particular symbol, the pentagram. It became for them (and is still) the symbol of the Microcosmos, for it pictured for them the process of self-generation and creativity. It could also be used to raise the dead. And inscribed on a door step it will keep away spooks.

We seem to have wandered far afield from our starting point, the first problem we proposed to consider, — the nature of the emotional response stirred up by the introduction of the Life-Death Instinct theory into the structure of the psychoanalytic theory. This is not really so, as we shall eventually see. We have provisionally tried to illustrate the situation we are going to see in the analytic world by comparison with some events of an analogous sort from the history of mathematics, the science par excellence of symbol manipulation. These illustrations have at the same time had the purpose of refreshing in our minds some characteristic features of any process of theorizing, which abstractly considered is always a process of manipulating symbols according to certain rules consciously laid down in the beginning and others unconsciously assumed. What is obtained by this process is an abstract formal statement that can be called a fiction. The starting point of any such process is some concrete fact or situation observed in the world around us. We name this particular fact, and abstract from it some relationship of the entities involved. We embody this in a statement such as: A has some relation to B. With this as a starting point we proceed to manipulate the statement (the form) according to the given rules. By this process we derive further statements from the first one. In the end we come back to the world of reality to try and discover if the entities our statements have predicted will be there, — are in fact there. This is the process called searching for an interpretation. It could also be, and is, called verification. When the entity predicted by our theory does not seem in fact to exist, either we have committed some error in our calculating, or else we have not properly understood our results; have been misled, perhaps, by some incidental but irrelevant connotation carried by the name chosen. In all this I am speaking, of course, of the person who has not unconsciously assumed that the mere fact of naming something real or

imaginary has created or necessarily implies that the named possibility exists. For this latter type of person, there is no need of verification by resort to reality.

We are going to examine some of these processes in more detail later; hence this quite superficial survey should suffice to indicate the nature of the events that lead to emotional disturbance in a theorist. Of more importance for our purpose is the clear indication that the kind of behavior called "constructing a theory" falls into two parts, — First, the construction of a fiction, an internal process consisting of the taking of something from the outer world into the body, and of there doing something to this ingested something. Second, the act of selecting something again in the outer world of reality to which the transformed original material can be applied. In the world of systematic theorizing such a fiction is called a hypothetico-deductive system. It is a tool for ordering the chaotic world in which we live. In a sense it is a substitute for that world. Since it is of our own creation, we expect it to be easier to manipulate than the real world. From another point of view, it is also a set of instructions of how to deal with the real world. It says: if we do so and so, such and such should be the result. If it fits the real world and produces the order we desire and expect, we regard it as true and no longer call it a fiction. Our feelings demand that however we may manipulate this construction of ours, it shall not produce terrifying results such as we had no reason to expect and anticipate. If it does do this, we are confronted with a dilemma, perhaps our expectations were too limited, perhaps the terrifying results are not true. It is a situation fitted to produce an anxiety.

II.

We have now to proceed to our second problem, and investigate the question of how far modern biological theory and speculation, in particular how far the concept of the tendency to maintain stability, provides such a hypothetico-deductive system or scheme which contains implicitly a conception that can be regarded as equivalent to Freud's Life-Death Instinct theory.

It is our purpose now to have a look at a modern conception of the "tendency to maintain stability" as a characteristic tendency of living organisms. We wish to see whether a concept of a "death-instinct" is implicitly contained in such a conception. If we can

find something to which we can attach this label, what will it look like in physico-chemical terms? How will it compare with the psychoanalytic conception?

We shall proceed by first setting up a symbolic form which we will assume to be quite general in application, since it will be defined for any manifestation of one of the tendencies to be found among those characteristic of the "steady state." We shall show reasons for taking this name rather than "stability." For our purposes, the tendency we assume shall be fundamental. We will then apply our formula in turn to various concrete manifestations of the general tendency. In the first place to some features of morphological behavior, the development of specific structural features. In the second place to acts of behavior proper, the kinds of activity with respect to the external world that are carried on by means of and as a result of these morphological differentiations. All of which amounts to an interpretation of the variables in our formula.

The general line of development I shall follow was in the main suggested by some points in a recent paper by Lillie¹⁵ which incidentally was the immediate stimulus to this paper. Since his was very general, I have introduced my own illustrations and have stressed points in which he was not so especially interested. It is likely that my conclusions are very different from ones he might have drawn. Since I am not wishing to make him responsible for anything said here, I do not consider it necessary to provide a summary of his views. What I have taken from him would probably become clear in the course of what follows, but it might just as well be stated here.

My attention was called to the concept of "steady state," and the literature on it, by his paper. And also the notion that the whole of biology, of all existence, could be viewed as a system of steady states nested one within another. Of that much I am certain. Probably the order in which I have put the whole together has some claim to originality, but that is not important.

We have raised the question above whether Freud originally took over his principle of stability from Fechner, as might be suspected from his mention of it in 1918. Fechner's principle was published in 1873.¹⁶ Today Fechner would be called a vitalist.

15. Biological Causation. By R. S. Lillie, *Philosophy of Science*, July, 1940, Vol. 1, p. 314.

16. G. T. Fechner, 1873. *Einige Ideen zur Schoepfungs- und Entwicklungs- geschichte der Organismen*. Leipzig. p. 41.

He was also a dualist. His principle was used to explain the evolution of the inorganic from the organic, not the reverse as in the modern conception, which was clearly also Freud's belief. The view that evolution had proceeded from the inorganic to the organic seemed to Fechner inconsistent with his principle of stability. This principle as stated by him was a statement of his assumption that matter tended periodically to return to its former state of existence. We could call it a repetition principle rather than a stability principle. Any further investigation of Fechner's views we will reserve for later consideration when we come to look into the history of this whole trend of thought.

From this much we can see that, whatever "stability" may have meant to Fechner, we can not use his word unreservedly to apply to a concept which is a component part of a different theoretical system. Psychoanalysis claims to be a science like any other of the contemporary sciences, to be, in fact one with the others in its general point of view. Perhaps this claim is not well founded, and may be pure self-deception. However, we shall assume that it is justified. And in such case the principle of stability we will be interested in is not that of Fechner but that of the physico-chemical thought of that day and ours. The details of Freud's education are not known to me. Assuming that he was exposed to the scientific view then in vogue, which our contemporary views develop and extend, we will take it for granted that his views did not depart radically from those of his scientific contemporaries. We know that he thought of his libido theory as a direct continuation of the views that were going to be held some day by biologists when they got around to making the explorations necessary to bridge the gap. We know that he made a tentative effort to bring his libido concept into line with the physico-chemical knowledge of the day. This effort was premature and could not succeed at the time. But we have no reason to suppose that Freud ever gave up the idea that some day, by some one, it would be accomplished.

The "steady state" concept we are going to explore is the direct continuation of a line of thought that had had its origin in the middle of the 19th century as a development of Clausius' 2nd law of thermodynamics. In 1884 Le Chatelier published a generaliza-

tion of a thermodynamics theorem of van't Hoff's which the latter had called the "principle of mobile equilibrium." Le Chatelier extended the theorem to cover any parameters, not just heat or pressure. The principle was a generalization based on experience, not on apriori considerations as was Fechner's. The principle of Le Chatelier became of fundamental importance in thermodynamics and physico-chemistry, and is now being extended to biological fields.

One statement of it reads:

"When a factor determining the equilibrium of the system is altered, the system tends to change in such a way as to oppose and partially annul the alteration in the factor. The same idea is conveyed by saying that every system in equilibrium is conservative, or tends to remain unchanged. That is, considering a physical or chemical system in equilibrium, the equilibrium being fixed by the nature of the system and conditions such as temperature and pressure, the principle states that if we alter one of these conditions or parameters, say, the temperature, the system will change in such a direction as to tend to annul this change in temperature."¹⁷

This principle became of fundamental importance in the structure of physico-chemical theory and wherever Gibb's heterogeneous systems, in dynamic equilibrium, are in question. But in such states of equilibrium the total flow of energy is 0; action is exactly balanced by reaction. The very characteristic of life, and of the organic processes of life (or better, of systems) is that there is no such balance of action and reaction; the total flow of energy is not 0. Instead, the type of equilibrium characteristic of the systems we call living beings is established only at the price of a steady but constant expenditure of energy in one direction, even when in the resting state. Biologists, in the broadest sense of the term, given to thinking in mathematical terms, have awakened to the fact that such states should be called "steady states." Strictly speaking, they are not states of equilibrium. States of equilibrium are exhibited by machines, and for a long time it has been customary to compare the living organism to a machine. This was an approximation serving many useful purposes, but not sufficiently close to exclude the vitalists and theologians. Even biologists were unable to overlook the

17. *A System of Physical Chemistry*, W. C. Lewis, vol. ii, p. 109, Longmans, 1919.

discrepancies. One always had a tendency to complete the picture by some sort of conception of the "Divine Spark," usually hidden behind the mask of "psychology." We will return to this discrepancy later. Here we are concerned only with the fact that biologists awakened to the fact that living organisms are not machines but differ in a very fundamental way.

Some unknown biologist has very neatly phrased the distinction between machines and living organisms. A machine continues to function only so long as its component parts do not change their shape and size in relation to each other; a living organism ceases to function, and dies, unless this particular kind of change takes place unceasingly. A machine dies if its parts grow; an organism if its parts do not grow. Thus the living organism is undergoing continuous change and transformation which, like any other process of transformation, can be described in mathematical, more particularly, geometrical terms. It is one task of any such description to discover and state what remains invariant under the transformation. This task has only begun in the last decade or so. Today we are only on the eve of great accomplishments, how great we have no way of knowing; but it is possible to discern in a shadowy and vague way something of the possibilities that lie ahead of us. The field is so vast and the results are already so great that it is not possible for the casual onlooker to be fully informed. This particular onlooker believes he can see some general features which are of interest to psychoanalysis in that they are analagous to what psychoanalysis has discovered as certain characteristic psychological processes. Perhaps here too the onlooker can see things that those in the thick of the fray do not see. The situation permits of a parallel being drawn with the analytic situation. There the analyst is an onlooker watching the behavior of one individual (not many) engaged in the task of ordering his ideas and quite unable to see through his difficulties because of his unconscious and unstated assumptions. It is also well known that if the analyst in question makes the same unconscious assumptions as his patient, he fails to benefit his patient. The task on the analytic level exactly corresponds to that characterized by Whitehead, and mentioned above, in connection with world philosophies. We do not presume to think that what we may observe can be formulated so as to contribute anything to the task of the biophysicist. But we do believe that we

can observe something the formulation of which can be of interest to the psychoanalyst. We return to the consequences of thinking in terms of the "steady state."

Stimulated by the comments of A. V. Hill, who pointed out¹⁸ in 1930 and 1931 that in living organisms one had to consider "steady states" not conditions of equilibrium, and awakening to the fact that there had been as yet no formulation of a general mathematical theory for the steady state (not even a theory of the most elementary sort), A. C. Burton¹⁹ undertook to investigate the possibility of providing such a theory. On the basis of the simplest assumptions it seems possible to make, and starting with the simplest possible equilibrium system, he works out the theoretical properties of the simplest theoretical steady state system. This shows some of the fundamental properties we associate with living organization. It does not show all of them, but it is easy to account for this in theory. In the first place, time factors do not enter into his theory. Some of the missing properties can probably be accounted for in this way. In the second place, his system is an uncomplicated single one. In life, the organism is composed of many steady state systems which interact and depend on others. We can see this, but it is not yet possible to formulate the situation in mathematical terms. By this much Burton's scheme is a promise and not yet an accomplished fact. However, some of the data which cannot be predicted mathematically can be supplied from the work of Cannon,²⁰ Henderson, and others in the experimental field, and this we will draw on to some extent below. While superficially, or better, externally considered the processes studied by these men look to be those going on in the interior of a steady state system they are concerned with the maintenance of a steady state within the larger whole, in ways which we shall consider.

Having made his theoretical equations which gave the possibilities of making certain predictions as to results on assuming speci-

18. A. V. Hill, 1930, Membrane — phenomena in living matter: equilibrium or steady state. *Trans. Faraday Soc.*, vol. 26, p. 667.

A. V. Hill, 1931. *Adventures in biophysics*. Univ. of Penn. Press.

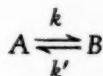
19. Alan C. Burton, 1939. The Properties of the Steady State compared to those of Equilibrium as shown in characteristic Biological Behavior. *Jour. Coll. and Comp. Physiology*, vol. 14, p. 327.

20. Cannon in his recent address as retiring president of the A.A.A.S. made an attempt to extend this concept to sociological fields. "The Body Physiologic and the Body Politic." *Science*, vol. 93, Jan. 3, 1941.

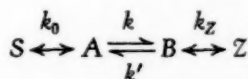
fied values for the variables, and having drawn the curves which resulted, Burton was able to construct a physical model with flowing water and an arrangement of bottles with a recording mechanism that would draw these same curves as theoretically predicted. He reasons from this verification of his theory that it is or will be possible to proceed directly from simple physical systems to living systems. And we see no reason to quarrel with this conclusion.

But it is essential to have a look at what he really found, and this can be done most simply by considering his mathematical scheme (the differential equations we can leave to one side as not essential for our purposes).²¹

One can write the "simplest imaginable equilibrium system" in this way:



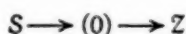
where A and B represent concentrations of chemical substances which react, let us say, and k and k' are the velocity constants for the action and reaction. With a given amount of A and B the reaction proceeds until k/k' does not become 0 even in the resting state, but has a small positive or negative (or fractional value) showing that the process is not symmetrical. It proceeds uniformly faster in one direction than the other. Also the A and B have to be renewed. Making these additions to the scheme it can be pictured in this way:



21. We need to remind ourselves that after all we are only exploring a possible line of thought, a system of theory, beginning with acceptable biological or rather physico-chemical principles. We wish to see what further assumptions need to be made or can be made to arrive at a psychological theory such as was constructed by Freud. At present this can only be done in a very inexact and crude speculative way which is not yet susceptible of being reduced to more exact mathematical or logical formulation. A lot of our work will be highly speculative, and highly dubious indeed. In a sense we are trying to retrace a path that Freud might have followed, but with a bit more care as to the logical possibilities. One might ask, why bother to write about and publish it? Why not try it out and suppress it if it doesn't work, and try again? Why inflict this preliminary work on others? The answer is that this has already been done several times and may be again; but that eventually, since anything of this sort is necessarily a collective group behavior from the very nature of scientific work, the preliminary work, however imperfect, must be published so that others may destroy it if necessary.

where S and Z represent source and sink (terms which will become clear in a moment) and k_0 and k_z diffusion constants.

We shall adopt a modified and simplified form of this *schema* for the sake of its pictorial value and not its mathematical one. We are dealing with living organisms, which so far as I know are invariably enclosed in a kind of membrane of some sort. They are set apart from the rest of the world by some sort of permeable boundary, and this we will represent thus (). Since we are not concerned in any except a general way with the internal processes, we can substitute for the $A \rightleftharpoons B$ simply O, for organism. Later we shall raise the question whether we may not also substitute E for ego, etc. Nor are we concerned with any diffusion constants or velocity constants, so we will drop the k's. Our *schema* then becomes this:



Before we sever connections entirely with k and k' and the mathematical possibilities, it will be well to notice some of Burton's findings. He finds that the characteristic types of behavior called, "adaptation," "rebound" ("post-inhibitory rebound" in reflex physiology), etc., types of behavior which we associate with living systems, can be shown to be comparable to what he calls "overshooting the mark." This occurs only in steady state systems, not in equilibrium systems, and occurs in connection with the transition from one steady state to another. Such transitions occur as the consequence of changes in the magnitude of the diffusion constants k_0 and k_z and their mutual relations. They correspond to the change induced by stimulation in living beings. The transition from one steady state level to another takes place at a cost of energy expenditure, which will be initially greater than when the system settles down into the new level. This is what he calls overshooting the mark. It seems to depend only on the relative magnitudes of the diffusion constants, and not at all on the velocity constants. (p. 340, op. cit.).

Experimental physiological work seems to indicate that the concentrations of calcium, potassium, and sodium in the medium (i.e., in the source and sink) alter the permeability of membranes and hence also modify the phenomenon of "over-shoot." The details

of this do not concern us; the general principle does, and we will use it for our speculations.

We may judge from this work that Burton has achieved an approximation to a complete theory which will bridge the gap between physico-chemical and biological phenomena. The approximation falls short of being complete, but gives promise of being capable of approaching sufficiently close to completeness.

Burton's theory also shows that the stability of steady state systems is subject to certain limitations. Such states can fluctuate between certain limiting values. Swings beyond these critical values, "threshold values," lead to disorganization of the system.

It is no mere figure of speech to call such disorganization death. We have here all we need to answer the question with which we are concerned in this section, but it will be interesting to elaborate a bit on it for the sake of discovering that some of the phenomena we think of as peculiarly restricted to the field of psychoanalytic interest can also be paralleled by phenomena at a lower level of complexity. I am making this statement too strong. Psychoanalysts have long recognized in a vague and general way that the tendencies and mechanisms they think of as restricted to their own field do in fact exist as general biological tendencies. And some occasional efforts have been made at a "bioanalysis." The possibilities in this direction are far from being exhausted.

In a system in equilibrium every process is balanced by one in the reverse direction proceeding at the same rate, so that the total energy exchange is 0. In a system in a steady state we have this same opposition of internal and external forces, but reactions proceed uniformly faster in one direction than in the other. The distinction here makes for certain differences in the mathematical formulation of the basic differential equations; the velocity constants in the two directions are different, for one thing. For us it is only essential to notice that there is a constant dissipation of energy, and of course eventual death if and when this dissipation becomes total.

A crude and familiar illustration of a system in a steady state (not a chemical system) for a short space of time is provided by the vortex that sometimes occurs when the water is allowed to run out of a wash basin. As long as there is water to run out and a place to run out, a configuration occurs that is very stable. The

vortex is, roughly speaking, an invariant as regards its shape. As regards its constitution in terms of the particles of water, it is constantly changing. Each particle of water as it leaves the bowl participates for a moment in the vortex. It comes in at one side and goes out at the bottom. The path of any particle of water in this process could be described in mathematical terms as a curve, starting at the point of origin of the particle in the bowl when the water was stationary, and ending at the point of egress. No two paths would be exactly alike. The starting point at least would be different. But they could all be described in terms of one basic curve as transformations in that curve, the portion of the curve forming the vortex being invariant under the transformation. This is one example of the sort of situation for which Burton undertook to construct a mathematical theory, not in terms of motions of particles²² as here pictured but in much simpler terms of changes in concentration of substances.

For every particle of water that enters the form of the vortex at one side, another must leave it elsewhere, otherwise the form would not be invariant. In this way the total number in the vortex from any given moment to the next is relatively constant. The steady state of the vortex will continue to exist as long as there is water in the bowl [the source (s)] which under the influence of gravity can run out at the open drain pipe [the sink (z)]. It is clear that for the steady state to continue the amount of water in the s must be very large or be continuously renewed, and the z must remain open so that the outflow is unimpeded. That these two factors, inexhaustible s and open z, were most important determinants of evolution, we shall see below.

This oversimplified model we have used to illustrate from the standpoint of easy visualization the sort of activities and structure that constitute the feature of life which we call steady state. The conditions in the living being are vastly more complex, so complex that as yet science has merely begun to analyze them. On the basis of what is now known we may surmise that the living organism is compounded of hundreds or thousands of steady state systems which mutually influence and depend on each other in

22. Those interested in the steady state theory in terms of kinetics of particles will find much to their purpose in Nicolas Rashevsky: *Mathematical Biophysics*. Univ. of Chi., 1938. Rashevsky has constructed a biophysics mainly on the basis of the equation of diffusion.

ways that at present defy analysis. We may feel sure we have in the steady state one of the basic processes of life. In a vague and speculative way we can suggest some of the possible complexes into which it enters.

The living organism is, so far as I know, without exception enclosed in a membrane across which, by processes of diffusion or something similar, the exchange of substances and energy takes place. In this respect the living organism differs from our model, so that the passage of substance through the form is not simply a matter of inflow and outflow as it is in the vortex. This makes the mathematics more difficult, but does not alter the principle.

We have been preparing the ground for a speculative flight of our own. It is customary to dignify such a venture with the label "synthesis." The bit of synthesis we now attempt will come from the application of some analytic or behavioristic concepts to biological phenomena. We will make use of our modification of the Burton *schema*, and an assumption: all steady states, and all living activities from the simplest to the most complex, in so far as they are expressions of the properties of steady states, or are for the purpose of maintaining steady states, can be reduced to this simple formula or symbolic *schema*:

$$s \longrightarrow (0) \longrightarrow z$$

This enables us to picture one of the changes characteristic of more complex evolutionary development,—or perhaps we should say, one of the morphological transformations that goes with development from monocellularity to multicellularity. It is a change which becomes of the utmost importance for the development of behavior. The form of the simplest living organism tends to be globular. This shape is known to be due to surface tension forces working against certain inner forces, osmotic pressure and others. Here again analysis has only begun. These forces are known to be upper limits to the possible size of the cell. Beyond a certain point it splits into two, etc. As the single cell organism becomes multicellular in the course of evolution and of individual development, in the case of embryonic development of the higher organisms its shape changes but still continues to be dictated, so we may surmise, by the same forces of surface tension and so on. The elementary mathematical analysis of these processes of transformation was

begun a number of years ago by D'Arcy Thompson²³ and is being continued as the new science of biophysics under the leadership of Rashevsky. It is still in its simplest beginnings, but already progress is such that there is no reason as yet visible to suppose that all questions of organic form may not be reduced to the play of known physical forces.²⁴ Where further up the scale the morphological configuration becomes more complicated and difficult to interpret and analyze into such simple physical forces, and where of course this morphological structure becomes the basis for behavior, it is difficult to resist the temptation to interpret the morphological structure as caused by the future behavior. We will go into this question again.

The multicellular organism begins as a single cell which by segmentation and cleavage doubles and quadruples until it reaches the blastula stage, and then invaginates; i.e., undergoes a transformation into a gastrula. This transformation and its further development into an axially or a bilaterally symmetrical organism takes place along lines we need not specify in detail. One aspect of this progressive transformation does concern us. Looking at it from another point of view we may say that the organism has, by this process of invagination, enclosed a bit of the external world. If we follow out the fate of this bit of incorporated external world we find it built into the morphological structure and subsequently into the behavior structure of the developed organism. It not only becomes part of its body structure, it also becomes the center around which the organism develops its behavior systems,—those systems which we call instincts. Embryology shows us that the lungs, gastro-intestinal tract, genito-urinary system, the central nervous system, etc., are constructed around such bits of incorporated membrane that was once exposed to the external world. Except in the case of the central nervous system it still remains a membrane exposed to a bit of internalized external world. In terms of our steady state model the organism in its growth development has incorporated portions of its source and sink. Still using parentheses to represent the membranes, we can picture the transform-

23. D'Arcy W. Thompson: *Growth and Form*. Cambridge, 1917.

24. Rashevsky. *op. cit.* p. 137.

ation in this way (using primes to represent the external s and z , and the surface exposed to the outer world).

$$s \rightarrow (0) \rightarrow z \dots \text{becomes} \dots s' \rightarrow (s \rightarrow (0) \rightarrow z)' \rightarrow z'$$

We might pause here a moment to notice that this particular tendency in development is a nodal point from which diverge two opposed world views, or theoretical systems. This morphological change in the structure becomes the foundation for many subsequent developments, as we shall see. Was it therefore produced, "caused," by the uses to which it is subsequently going to be put? This is the teleological view which sometimes becomes a "psychological" view. Or was it caused by forces, physico-chemical in nature, active at the moment and in the immediate past? From this latter standpoint, which is that of the modern scientific view in vogue at the present (what we call *the* scientific point of view), if such a morphological change comes about and is fitted to be the beginning of future developments, it is quite by chance. If such changes aid a steady state to persist, they themselves will persist as part of that steady state. It is simply another version of Darwin's law of survival. There will be many repetitions of somewhat similar stages from one type of organism to the next, but there is no need to bring in any "biogenetic law" such as is associated with the name of Haeckel. The repetitions are amply accounted for by the mere fact that in the beginning there is only a limited number of possibilities.

This process of morphological transformation has been of tremendous importance for the evolution of living organisms. Where the primitive organism presumably developed and of necessity had its beginnings in the sea, which was both s and z , and had perforce to remain there in order to continue its existence as a system in a steady state, the higher organisms have become more and more independent of the sea by virtue of incorporating a fragment of the sea to become the blood system. The higher organism became free with respect to s' and z' by virtue of making s and z part of its structure as a conservative system. It is a commonplace now that the chemical composition of the blood bears a very close resemblance to that of the sea. It is also a commonplace that the individual cells of the body continue this primitive relationship of being immersed in their fluid matrix, this "*milieu interne*," which, like the sea for the original germ of life, continues to be source and sink for the steady state of the cell. It is perhaps to

Claude Bernard that we owe the recognition of this fact. It was certainly he who in 1878 called attention to the necessity for maintaining a fixity of condition, a steady state, in the blood. He predicted that all the vital mechanisms would be found to have the purpose of maintaining this steady state in the internal environment. W. B. Cannon has devoted his life as a physiologist largely to working out the actual details and the mechanisms by which this purpose is carried out.²⁵

Failure to maintain a steady state in the internal environment results in death. Maintenance of the steady state, i.e., life, in the cell depends in part then on the maintenance of the steady state in which it is immersed. But only on the psychological level do appearances incline us to the notion that this exterior regulation may come from a later level of complexity. Here is an opening for the old puzzle,—which was prior, the hen or the egg? Which regulates which; the blood the cell, or the cell the blood? The answer is to be obtained by considering the genesis of the whole; they both developed together.

The immensely complex chemical operations required to maintain the blood in its steady state, its relatively fixed hydrogen ion concentration and fixed chemical composition, have been in part analyzed by L. J. Henderson and his co-workers.²⁶

Here again the situation is of such immense complexity, and the number and relationships of the variable factors so great, that only a beginning has been made towards the mathematical analysis of the situation. Where the single celled primitive forms of life are dependent for their continued existence as conservative systems upon a relatively unchanging external environment over which they have no control, (living) organisms may become independent as multicellular organisms by incorporating a bit of the source and sink into their structure and then developing types of activity, physiologic and behavioristic, which have the aim of maintaining this incorporated bit also as a steady state. To state it crudely and inexactly, growth gives way to behavior.

25. *The Wisdom of the Body*. By W. B. Cannon. This book reports on the investigation of many of the physiological processes devoted to maintaining homeostasis (steady state) not only in the blood stream but in the respiratory system.

26. L. J. Henderson: *Blood*. Yale Univ. Press, 1928. See also his "Fitness of the Environment" for a consideration of the physical and chemical characteristics of the sea that made possible the beginnings of life.

It was said above, and bears repeating, that it is possible to look upon these tendencies from two opposed points of view,—both evolutionary. First, that of the modern scientist who regards the psychological phenomena as late developments in a continuous series of transformations; and second, the point of view that regards the psychological as there from the very beginning as a determining factor,—the Fechner point of view. Both are attempts to account for the phenomena exhibited by a series of characteristics of systems. The phenomena can be ordered as a series of some sort, showing a progressive complexity towards the appearance of being psychological,—i.e., "spiritual." The question is, was the spiritual there from the first and simply unfolding, or was it something that developed later? Perhaps it is even an artifact of human creation projected or retrojected back into the series. In short, did man discover the soul or invent it? One can argue that it is a purely relative matter. One can equally well take either choice. It is only essential that, having made the choice, one stick to it consistently and not try to straddle. The title of Cannon's book smacks of such straddling, for instance, but at the same time it brings out that many or all of the physiological processes can be regarded as having a psychological appearance in the way they are integrated and work together. Many scientific workers scorn to have any dealings with philosophy; this simply means that when they get around to being philosophical, they unwittingly straddle and get into trouble.

Returning to our theme, it takes no great perspicacity to see that the organism is a very complex structure consisting of a series of conservative systems, nesting one within another and each dependent on the simpler systems lying beneath. What kind of a series? Linear, hierarchical? We can only raise the question. Some day the answer will be important, since we already have reason to suppose that such difficulties as those about the different points of view mentioned above arise from trying to picture organic order in too simple terms, that is, in terms of linear series rather than in terms of some more appropriate series. Woodger has gone deeply into the matter with respect to embryology and genetics. We may surmise that his results will some day be extended to our material. A good short account of Woodger's work can be found

in "Modern Theories of Development" by Bertalanffy.²⁷ At present we can only say that the maintenance of one steady state, say that of the blood, depends in part on many others. In the instance of the blood, it depends on the regulation, among other things, of the carbon dioxide concentration in the blood stream, this in turn on the maintenance of a relatively constant carbon dioxide concentration in the lungs, and this again depends on the automatic regulation of the respiratory function,—that is, on a kind of behavior. But this behavior has the purpose of regulating the concentration of a substance in a bit of enclosed source and sink, which are here again combined in one, as in the sea and the blood. It is not necessary to look on this whole situation from the teleological point of view, but it is very difficult to avoid doing so. Those who approach the situation from the standpoint of the fully developed system are almost certainly bound to regard it as a situation where every growth process had the purpose of providing a structure to support a system of behavior, and the behavior has the obvious aim of maintaining the very processes that lead to its development. But this implies a psychological motivation,—not to mention a certain appearance of circularity. Not only is this teleological point of view difficult to avoid, but so also is the psychological one, and the two are often confused. It is difficult, and therefore avoided, to analyze the whole situation in terms of a repeated application of Le Chatelier's principle. Perhaps in the end it cannot be done, since it has not yet been done. But why be faint-hearted?

For the present we will drop the point of view that the earlier stages happen because the later ones can take advantage of and use them. We will consider only the fact that earlier stages happened by reason of the physical forces effective at that level, and that some of these earlier stages were capable of persistence as steady states and did persist. These in turn become the components in a new development as the result of the conflict of physical forces effective at that new level, again with the occasional production of steady states, and so on.

All I am trying to express here is a point of view taken in the main from Lillie, a point of view which I believe to be the cur-

27. Oxford Univ. Press, 1933.

rent one and which regards the whole universe as a system in the process of evolution from simple to complex. As Lillie points out in the paper which was the immediate stimulus to my own speculative efforts here, this whole process of evolution is one of continuous individuation; any two objects, however much they may be alike in other respects, differ in that they each occupy their own individual point in space and time. This is a matter of chance, but in itself it has considerable importance for the rest of the universe.

We will return to the activities and tendencies of a given organism. We can describe its activities as in the first place reactions to external constraints, reactions which have the effect of opposing the external constraints, of negating their effects, and thus enabling a system in a steady state to persist. At whatever level of complexity we examine the situation, however far we proceed microscopically or macroscopically, we find this to be the case. When we look at our results we find that we can arrange them in a series of tendencies, modes of activity. While from the one type of activity to the next there are differences of complexity, the series is more or less continuous in the one respect of having the effect of maintaining in this same general way the steady state at that level. It can be named, in terms of its more complex members, the series of life impulses. If so inclined one could call the series the various manifestations of the Life Instinct. Perhaps to do so would be misleading. It would tend to bring in, quite unwittingly, various irrelevant connotations. It would be better to follow the algebraist and simply call it the series X.

We have to ask ourselves if this series is a continuous one. Are there any gaps in it? Just where does the purely physico-chemical give way or intergrade into the purely psychological? Is there a gap at this place? In fact, we cannot yet answer these questions. We are even justified in thinking them foolish questions. Perhaps the names depend only on the point of view, and are purely relative to that. Looking at the organism objectively, everything is the resultant of purely external physico-chemical forces working against opposing factors. Looking at it from within, from the subjective standpoint, everything is the result of psychological causes working against external limiting factors. Looked at either way, what from one standpoint is regarded as a limiting factor

against which a cause works, is from the other standpoint a cause working against a limiting factor. We simply interchange the names. This situation, as Lillie points out, leaves only a small possibility for something which we can call a really psychological cause. And this is the fact that, no matter how detailed our analysis, there remains a bit of activity on the part of the steady state that we can only call accidental and spontaneous and creative, since it always introduces something new in the universe, some departure from the lawful which we cannot account for in terms of the past nor in terms of any external condition or factor. Lillie is a biologist and not a psychoanalyst. If he had been thoroughly imbued with the analytic approach, no doubt even this bit of remainder of spontaneous and chance behavior would disappear. It is possible to include many, perhaps all, so-called psychological activities in the series X.

Before we look into this possibility, it is perhaps in place to point out that if for some reason the particular tendency X,—i.e., the reaction which maintains the steady state at the given point of interest—fails to take place (and there are many accidental reasons for such failures), then the given steady state tends to disrupt and disappear. This is death,—the death of the organization at that level. It does not necessarily mean that the process of dissolution and devolution proceeds downward very far. And in no case does it mean that everything goes back to the very beginning. Things simply go back to the next stage or point of independent stability. Thus the individual does not necessarily die because his society dies. The complex organic molecular structures do not necessarily prove unstable because the organism of which they form component parts has died, etc. Thus there is so far no reason to suppose that a tendency *other than pure chance* is to be found in the universe, such a tendency as would be pictured as the complete counterpart of the tendency X. For this we cannot consistently use even the second law of thermo-dynamics, the tendency of the entropy of the universe to increase, a law which has sometimes been called the Death Instinct. On the contrary, the second law can equally well be considered the X tendency. However, these are only questions of verbal usage dictated by one's conscious and unconscious theoretical predilections. The names we give tell us nothing about the world of fact. It is only important not to think that they

do. The reason we chose the name may tell a good deal about us.

Before we wandered off in pursuit of the meaning of the words "teleological," "psychological," etc., we were considering the tendency of the organism to increase in complexity in its own growth and in the course of evolution. This tendency was pictured in this way:

$$s \rightarrow s(0) \rightarrow z \rightarrow s' \rightarrow (\rightarrow (0) \rightarrow z)' \rightarrow z'$$

In words, the tendency for the organism to incorporate certain bits of its immediate environment into its structure and then to develop modes of behavior which have the effect of keeping constant the concentration of desired substances in this bit of invaginated external world. The development of this tendency has enabled the organism to become free, within limits, with respect to the outer world. The organism would still react to change in the chemical constitution of its environment, just as it always had. It would, for instance, still react in physiological ways to maintain its water balance in its proper relation to the inflow and outgo from source into sink. This would go on for a time independently of s and z , otherwise the whole process would come to an end and death ensue. This kind of activity which brings s and z into relation to s' and z' is that type of activity which we call behavior, and which we think of as psychologically motivated. It is easy to see that this type of activity conforms to the requirement of "spontaneity" which Lillie spoke for. Clearly any observer watching the organism, that is the (.....)', and not knowing about and hence not taking into account this activity and behavior dictated by the need to react to the self-contained bit of external world, the s and z built up into the structure of the whole, would regard the observed activity as spontaneous and not the effect of "external causes." But it is just as external in the one case as in the other.

The basis of all living activity is the tendency to maintain a balance of substances and energies across a membrane that divides the organism from the world. This balance is not an equilibrium in the sense that the total exchange of energy is 0. It is a balance that is maintained by the constant expenditure of energy in one direction. This expenditure is for the purpose of maintaining certain optimum or necessary concentrations of chemical substances, temperatures,

pressures, etc., inside the dividing membrane irrespective of what those concentrations, etc., may be outside. This necessity is created by the fact that here, as in the vortex, these materials are, as individual particles, in flux. They are not a permanent part of the material constitution of the system. Here, as in the vortex, it is only the structure that is relatively invariant; the materials which enter into the structure and constitute it do so only temporarily. They have constantly to be replaced. Eventually the organism has to take account of the concentrations outside; these have to become favorable if they for some reason have ceased to be so. Either these outside concentrations have to change by reason of their own laws (a pure matter of chance for the organism in question), or else the organism has to go where they are more favorable; in either case the penalty of failure is death. The organism has developed in the course of evolution the possibilities of making such moves. It has also developed indicator organs in the limiting membranes, which have the function of testing the external concentrations and of predicting changes. The organism has also developed muscles for the sake of acting on these predictions. These indicators go into action when the inner need arises, and perhaps only then; that is, when the influx of some material (e.g., sodium chloride) has not kept pace with its efflux. The muscles go into action in the first place to bring the sense organs into connection with the desired substance, in the second place to bring the requisite bit of absorptive membrane (for in the course of evolution the membranes have also become specialized and subdivided in their absorptive functions) into contact so that absorption can take place.

This whole pattern of activity begins and ends in physiology, and this in turn is the continuation of simple physico-chemical activities which we can find exemplified in inorganic steady state systems. Only in the middle phase, which brings into play the sense organs and the muscles, do we speak of behavior proper, and think of it as being psychological in its motivation. The only thing about the whole pattern we do not know how to deal with, nor how to classify in the above scheme, is the growth tendency which provided the structure that did the behaving. It is clearly not psychological in any usual sense of the word. We will leave this question to one side. We will postulate, as did Freud, that only those phenomena are psychological or have psychological representation which involve

the type of energy exchange or activity necessary for maintenance of homeostasis. This type of activity must occur by way of the neuro-muscular system. Freud postulated this in his assumption of the "fiction of the reflex apparatus set in motion only by the wish." We will defer consideration of this "fiction."

I have said above that the sense organs go into action only when the inner need arises. This assertion needs some justification, since it is not an obvious fact. Fortunately it has been submitted to experimental investigation in special cases and found to be true. My assertion, perhaps, generalizes too far beyond the known facts.

Chickens, because of their egg laying behavior, develop a special craving for calcium. An experiment made on this special craving seems very significant in the present connection. It is reported by David Katz in his "Hunger und Appetit" (1932). I will quote the relevant matter in my translation:

"For the satisfaction of a special hunger it does not appear to be necessary that the sense of taste of the food satisfying it be really experienced. There is also a satisfaction by inner ways. For this we have the experiment carried out by Hellwald in the Rostocker Institute. Some hens in the laying stage were for some weeks fed with food as free from chalk as possible; shortly after the institution of this period of feeding, no more eggs were laid. By means of this chalk free diet it was intended to create the strongest possible chalk hunger, and that this was successful was shown by the critical experiment. After the course of some weeks the hens were divided into two groups, each of which was then fed with a differently prepared meal, the one with chalk, the other without. This food consisted of bits of macaroni, which for the one group were left empty, for the other were filled with bits of broken up egg shell and sealed off with bits of dough. The taste sensation was thus the same for the two groups, but the one group received a fairly large amount of chalk, the other none. The critical experiment now took place some hours later (that is, undisguised egg shells were now placed before each group), and would of course be confirmed by the amount of egg shell that would be then taken up by the two groups. The difference was very clear; those hens which had eaten the chalk macaroni ate appreciably less chalk than the other group which had received the chalk-free macaroni. Obviously by some inner route the

chalk hunger of the one group had been, if not totally extinguished, appreciably diminished."

It seems clear that either visual or smell impressions, or both, must play an important part in the hens' selection of food. This experiment tells us nothing definite about that. The indication is that perhaps the visual cue is the more important one. In any case the specific sense organ was desensitized from within by the unconsciously absorbed calcium, and the hen was no longer responding to the inner need because it no longer existed. Katz speaks of the need being diminished or extinguished by some inner route. More than that cannot be said. No answer can be given to the question whether the point of application of the ingested calcium was to the sense organ by means of the blood stream, or further back in the central connections. With the respiratory needs it is back in the respiratory center, not in the sensory end organs of the lungs. So far as I know, we have no sense organs that detect the presence or absence of oxygen or carbon dioxide. But we have no basis for judging whether what is true in the case of the respiratory need can be extended to any other needs of the body. We here touch on a field that is only now being opened up to exploration. It is useless to try and speculate on what is going to be found. On the basis of anatomical considerations we know only that the same sense organs which have the function of indicating the presence or absence of any given substance in the outer world are located in proximity to the specialized receiving surface where the substance is taken in. But this statement only applies to the chemical senses or needs. And on the basis of every day experience with tastes, we can assume that in some instances the sense organ itself is especially sensitized to notice first the absence of the proper concentration of the given substance in the body, and secondly the presence of it in the exterior world. I dwell on this topic because it has to do with the physiological-anatomical aspect of the important psychoanalytic concept of cathexis. So far we have been dealing with the special sense of taste.

The senses having to do with the perception of distant stimuli (in particular, vision) are the ones which claim our special interest as psychologists. Many have noted for one reason or another that with vision and the behavior constructed around it we really come to phenomena that can be called psychological in the sense that we have to do with processes accompanied by consciousness. It was

G. Elliot-Smith, the comparative anatomist, I think, who pointed out that the brain, as we know it in animals undoubtedly possessing a conscious mind, is clearly the development and outgrowth of the centers connected with the visual sense; and further, that this development had overtaken and superseded an earlier start growing out of the olfactory sense. Freud also has commented on the importance of having given up smelling for looking. But as psychoanalysts we need not go so far afield for our evidence. Psychoanalysis has its real beginnings in a fact that is so obvious that nobody has apparently taken in its full significance,—perhaps even including its discoverer, Freud. This is the fact on which the whole of dream analysis is founded: that whatever the nature of the organic need, chemical or otherwise, that gives rise to a wish, the dream (if any) that arises to express this wish is almost without exception a visual representation. As I say, the fact is so obvious and commonplace that nobody stops to ask himself if it could or should be otherwise. Yet vision is one of the last senses to develop in the course of evolution. And animals have possessed the rudiments of psychological behavior, and therefore presumably "wishes," since the beginning of time.

We can easily bring the field of the visual sense and its attached neuro-muscular system into our general behavior pattern. The same applies to the auditory and olfactory senses, but for simplicity we will let the one stand for all. Up to this point all forms of activity and behavior that we have discussed have been cases involving the concentration of substances immediately contiguous to a dividing membrane. On the outside was the stimulating substance, the desired object; on the inside was the immediate responsive activity. The situation is no different in the case of the distance receptors as far as the immediate stimulus is concerned; vision is stimulated by the retinal image, just as taste is stimulated by the presence of water. But the taste of water is accompanied by the physical presence of water, whereas the retinal image is only a distant reflection of the object that cast it. And sometimes the object isn't there. The behavior in the case of the distance receptors is not a function of an immediately contiguous object, but of a distant one.²⁸

Sometimes it is behavior designed to bring us closer and make the object contiguous, sometimes on the contrary it is designed to

28. E. B. Holt: *The Freudian Wish*. New York, 1915, p. 75.

keep us as far as possible from the object. And these are the kinds of behavior we think of when we think of psychological behavior. All this seems so obvious and commonplace that it is difficult to write about. But it was just the obvious that, following Whitehead, we set out to consider.

Perhaps we are overlooking something important. A great deal of psychological behavior, particularly those varieties called "spiritual," are concerned with the images themselves and not with the object that cast them. In many cases there never was any such visible object, nor any retinal image. So man had to create the object to satisfy his "vision." He had the "image," but no object to fit it; so he made one. The very word "spiritual" itself is sufficient evidence for this. This word and its ilk, derived from one of the most essential and yet most imperceptible and formless of the substances necessary for our existence as a system in a steady state, has come to signify pure disembodied, dematerialized visual form. The consideration of the far-reaching effects of this transformation of the purely respiratory into the purely visual, a transformation to which we owe the very word "psychology," we will have to leave for later attention.

Failure to notice the existence of the possibility that the data of any sensory field can be translated or transformed into that of the visual by some process as yet undescribed, has in my opinion played a part in the greatest fiasco in analytic history. I refer, of course, to Rank's birth-trauma notion. Starting with the fact of the physiological consequences of the first separation from the mother, a situation in which clearly no visual perceptions could have played a part, Rank jumped to later psychological situations of separation from the mother without attempting to account for the nature of the transformation from the purely physiological to the psychological. That there is such a transformation seems to be clearly demonstrated by the numerous symbolisms of the birth situation which he was able to find. As one reads over the list of such symbolisms, vision seems to play a great part in them. Perhaps that is only the way it appears to a visually minded person. In any case there was a gap. Rank did not investigate it.²⁹ It is not

29. He did not even investigate the nature of the processes effective in the physiological situation of separation. Even an elementary knowledge of physiology would have been of use. It was as possible to state them then as it would be today, as Freud demonstrated in his review of the situation in his

clear that he even realized there was a gap to be bridged. He seems to have covered it with the word "reminds" (erinnert). (The dark room reminds the child of the primal trauma). Freud for one reacted to this word as if it implied visual memories;³⁰ in which case Rank's idea was little better than nonsense. I am not saying it was not nonsense in any case. I am just pointing out that somehow visual memories were supposed to be important enough for the critics to deny. Even today this notion of the situation has exponents as witness a recent critical note by Kaufman of Sharpe's book on "Dream Analysis."³¹ As Kaufman notes, an experience of birth that could not possibly have been seen by the child concerned was interpreted as having supplied the data (the nature of which is completely unspecified) which gave rise to a visual representation in a dream. Apparently it did not occur to Sharpe that there was here something to be explained.

That sensory data from one field can be translated into those of another, we believe can be shown. To be sure the process is sometimes (and perhaps always) a roundabout one involving a complicated exchange of activities between subject and object; a process of visual conditioning, if you like. One problem that seems to me not to have been sufficiently worked out is that growth

revision of the theory of anxiety a few years later. It is easy to picture this in terms of our thesis. Perhaps it would also be useful to do so. The details would have to be worked out elsewhere, since we are here only concerned with questions of general theoretical bearing. The birth situation corresponds to a loss of the initial *s'* and *z'* (the mother's body) and the replacement of this by the mother's *s'* and *z'*, the outer world. This is a process which takes a considerable length of time; it begins abruptly in the act of birth, and then tapers off as the mother gradually withdraws from her role of "assistant ego" (to use Rank's (?) later term) during the period of infancy. The problem that had to be explained was the alleged fact that every subsequent separation in which the infant took over some activity hitherto carried on by the mother (or her substitute) was accompanied by an attenuated repetition of the circulatory and respiratory phenomena of the first occasion of such a separation. This problem Rank ignored. As I see it, the problem he set himself to solve was the alleged fact that every such separation was also accompanied by other phenomena and behavior that could be interpreted as symbolic repetition (in phantasy, dream, or otherwise) of the birth situation. It is my feeling that most of the discussion and criticism turned on the question of memories of the birth situation. I am not concerned to reopen the discussion on the question of "birth-trauma." I am concerned to point out that there are some problems here that have been insufficiently studied. One has the feeling that Rank's failure has served as a deterrent to the further consideration of these problems. If such problems exist, they will again force themselves on investigators when some means of adequate investigation has been discovered.

30. p. 103, *Inhibitions, Symptoms and Anxiety*. London, 1936. Cf. also Sachs' review in the *Inter. Jour. Psch.*, vol. vi, p. 503, Oct., 1925.

31. p. 418, *The Psychoanalytic Quarterly*, vol. IX, 1940.

in this field, as in any lower one, by a constant process of exchange with objects in the outer world. Many perspectives open up from this point, and if we are not careful we will lose sight of the point we set out to investigate. We seem to be getting over into the field we think of as psychology. We started out to have a look at the biology of the neuro-muscular steady state system. We have not really gotten away from it, although it may appear so. We are still considering the transformation:

$$s \longrightarrow (0) \longrightarrow z \text{ into } s' \longrightarrow (s \longrightarrow (0) \longrightarrow z)' \longrightarrow z'$$

We have assumed this formula to be (for our purposes) the basic formula with which to order and systematize all organic behavior and activity. We are simply examining a special case, that of distance perception; in particular, vision. Just as further down the scale of complexity we saw a tendency to incorporate the relevant bit of source and sink into the morphological structure of the individual organism, a tendency which would be characterized in teleological terms as having the purpose of gaining freedom by controlling at least this split-off piece of reality, so here, too, we expect to find the same general state of affairs. Some of the material we shall have to consider will, beyond a doubt, be objected to as a playing with empty symbols, — as mere paronomasia, a playing with words. And that will certainly be the case. To this one might retort, so what? But I shall prefer to ask why the psychoanalyst should fear to tread where mathematicians and poets have led the way. We might recall that in the early days of psychoanalysis many an interesting clue to a problem was obtained from a pun.

But seriously one might still object that everything that is important, all the distinguishing features, are being left to one side. That is certainly the case. It took our forefathers a good many thousand years to see that two cows and two pieces of metal, or one piece of metal with a figure 2 on it, were exactly the same thing in the sense that they had a property in common which made it possible to substitute one for the other. All the ways in which these disparate things differed were not important and could be neglected, as against the one feature they had in common. But this is just the important feature that takes us to our next topic. That is the fact that if things have at least one sensory feature in common, it sometimes does not matter how much they differ in other sensory features.

The two perspectives that now lie before us as of especial interest

could be illustrated to interminable length by quotations from and references to the mountainous mass of material available. Many types of men have written from many points of view about the two points we are to look at. They have written in very similar terms. If this proves anything, it would seem that there must be some deep underlying common situation, or from the standpoint of theory, some theory of theories common to all these divergent attempts to deal with the situation. We can surmise that such a common basis has dictated the similar turns of speech that men have used. We may suspect that here lies one of the problems we set out to elucidate. The first perspective down which we wish to look is provided by these very words I am here and now writing. Many questions instantly arise. I shall not try to answer them. Why do I bother to write all this? What kind of effect will it produce in the world? For whom, and how?

Clearly it is above everything else a problem in causation by combined visual and auditory form. Words are going to do something to somebody, somewhere. For myself it is a problem of getting some formless something out there where I, for one, can take a good look at it. For some reason this is supposed to be very good for me. But at the same time doubts begin to creep in. One is exposing himself to the world; perhaps he will be attacked by his fellows; perhaps he will be acclaimed a great man in some respect. There is no need to elaborate on this line; everyone has experienced it for himself, in himself, and in his patients and friends. These emotions and phantasies are old familiar companions to us all; perhaps welcome, perhaps not. They are derivatives of that curious "organizer," to use Speman's embryological term, of human behavior which analysts have called the "castration complex."

But why should I have any expectation that this writing will be received with hostility by my scientific confreres? Such an expectation makes sense only if I am entertaining the idea (of course, quite unconsciously . . . at least, it was before I became introspective) that this material is somehow destructive or dangerous, to me in the first place if not ejected, to others if so externalized and objectified. But . . . this material is myself, is a split-off portion of myself. By it I would re-create myself (my thought, at least) in others. If my friends reject this, then they have rejected me, — and so on and so on. The literary and artistic efforts and sentiments that

have been expended on this kind of situation are so tremendous that we may assume it to have some importance. However, this sample will suffice for our purposes. This writing, considered from the standpoint of our friends the logicians, is a most inefficient way of achieving what it attempts. It is making deliberate use of, and quite unconscious appeal to, all sorts of connotations and who knows what else. This gives a feeling of very uncertain control. It tempts one to use all sorts of devices objectionable on many grounds. Here is cause enough for emotions, without appealing to castration complexes and narcissism. So they could say.

What have we gotten ourselves into? A logical and psychological turmoil, a state of contradiction from which there is no egress along the path we are following. That this self-regarding situation can be a psychological contradiction leading to death, was seen by the Greeks; they embodied it in the myth of Narcissus. But this writing is *also* an attempt to give form to something formless in me; and this, if felt to be a manifestation of the death instinct, is a feeling inconsistent with what we are depicting as the life instinct (the tendency to give form to the formless). In the main we have been considering how form is given to the formless by being taken into the organism from without. In this case of the self-regarding, we see the reverse; form is being given by the projection and extrusion of the formless something within into the outer world.

This contradictory situation into which we have gotten by becoming self-conscious is similar to that which the logician calls the paradox of Epimenides, after the Cretan who said: All Cretans are liars, and what they say is a lie. Was he a liar? And if he was a liar, was he then telling the truth? And if he was telling the truth, was he not then a liar?

The logicians have not as yet reached a consensus of opinion as to the proper solution of this paradoxical situation. One attempted method of defense, one solution, was the rule that what was said did not apply to itself. To some this has seemed a rather arbitrary and artificial solution. But we might apply the rule here, and break off the contemplation of this particular perspective. Before we do so we must note that it landed us in a difficulty. I will state now, and justify later, that this difficulty, this problem, was just the problem that on a clinical plane gave

rise to the concept of the Death Instinct. But this must be deferred to a historical survey.

The other perspective down which we proposed to look takes as its point of departure the fact that vision is a distance receptor. What does it receive? Visual configuration, of course. Not sodium chloride, not water, but the visual configuration of these essential things or of their place of occurrence. These chemical substances are absolutely obligatory for the persistence of the steady state of the living organism. The visual configuration associated with them is not necessarily so essential, at first appearance. We are reminded that the poet said: where there is no vision, the people perish. This poet had lived in the desert. The situation is clear. By contemplation of the visual configuration, by looking ahead and anticipating (is this another play on words?), the organism takes into its own organization, or prepares to do so at need, the essentials it requires and must have sooner or later. Again, by taking into its structure bits of the *s* and *z* (in this case the spatial and temporal features), the organism has achieved a gain in freedom. As they say, the organism has become more self-sufficient and autonomous. Here we reach a problem to which science has not yet supplied an answer. The configuration in question has been taken into the structure of the organism. But has this been built into the morphological structure by some process of invagination analogous to those we encountered lower down in the series? While we may believe this to be the case, we are not yet able to support the belief. The comparisons with phonograph records, etc., seem altogether improbable and fantastic.

We have now reached a point of view that opens up such broad vistas that one is appalled at the prospect. Among other things, we could from here proceed directly to psychoanalysis and fit in the greater part, if not the whole, of its terminology and findings. Many of the things we have come upon so far could be renamed in terms of familiar psychoanalytic concepts. We have surely been speaking of something analogous to identification, introjection, etc. This again we shall have to defer. We seem to be deferring a great many things, but I see no other way of proceeding. Besides, it seems to be a characteristic of life. Again we shall have to subdivide, and pursue one tiny thread.

The matter of conscious thinking, itself, is somehow involved

in this process of the visual appropriation of the world. Freud has himself expressed it that the boundary between the Conscious and the Unconscious is determined by words. And clearly words are primarily matters of visual and auditory (i.e., distance) perception. If we contemplate only scientific thinking and consider it only as a peculiar form of behavior, we may ask what is it trying to do? We get for an answer: trying to achieve a *visual* mastery of the universe. The evidence for this is double. In the first place the scientist has tended to become more and more an eye attached to an instrument which is an extension of his eye. But this instrument itself is an "externalization and perpetuation of the mind."³² The microscope and telescope are old familiar examples of this principle. The newest and most beautiful illustration of the principle at work here is perhaps the electron microscope, which now sees things (molecules) that only a few years ago were regarded as pure fictions, just as fictitious and imaginary as was the square root of minus one to the mathematicians a century ago.

The second bit of evidence is again provided for us by work in another field, by V. F. Lenzen in his book, "The Nature of Physical Theory." He found that whatever the science, speaking of course of the physical sciences, and whatever the nature of its basic material — objects, solids, fluids, gases, electric charges — in whatever relationships they exist to begin with, the resulting theory ends up with being stated in terms of geometrical (i. e., spatial and temporal) configuration. It seems obvious that this should be so. It would sound ridiculous to ask, why not in terms of colors, sounds, smells, or tactile sensations? It seems easy to explain colors in terms of spatial relations. Why not the reverse? Because the geometrical relations are primary, is the answer given. This is no answer at all, since it begs the question.

Again we are confronted with one of those situations referred to by Whitehead, where we are quite unaware of having made an initial assumption, because it is so familiar that we do not recognize

32. I am not overlooking the fact that Berkeley felt that it (even vision) was all an outgrowth of the tactile senses.

33. See, for instance, the discussion of this point in Merz: *History of European Thought in the Nineteenth Century*. Vol. II, chap. xi, "On the Psycho-Physical View of Nature."

it as an assumption forced on us and not one of our own deliberate choices. What forced it?

Again the teleologist can come along and give us an answer. It is very simple; that is much the easiest way to control the universe. The psychoanalyst has a different answer, having to do with the past rather than the future. It originates from the fact that in the field of vision arises just that aspect of "spirituality" referred to above. By vision we can maintain the utmost distance between ourselves and our objects. If the tactile and haptic sensations form the lowest pole of our psychic existence, vision (and its derivatives) forms the opposite pole. Our psychic life swings between the concrete and the abstract, the most intimate sensory contiguity and the most impersonal. Where the need for the maintenance of the steady state is intimate contact, the visual gives way to the tactile. Where on the contrary the need is to avoid dangerous contiguity but still maintain some sort of contact, the tactile gives way to the visual. But here as elsewhere, in this instance as in all others, whatever happens is a function of the whole organized system as it is at that moment constituted, including such of the past as still persists in its effects. It is not a function of what is going to be the state of affairs in some future moment, however easy it may seem so to explain things on the basis of insufficient analysis. Both modern biological science and psychoanalysis decisively reject teleological views.

It is necessary to emphasize this because some formulations that have been given to the life and death instincts in psychoanalysis sound suspiciously like statements couched in terms of a tacit teleological view, even if they are not meant to be so. "Death is the goal of life," for instance, certainly sounds like that.

We have been stressing mainly the intake side of our formula, partly for reasons of simplicity, no doubt. Before we leave this side it is essential to notice at least one other point about it. The more so as this particular point, we will find, was the aspect of things that induced Spielrein to entitle her paper "Destruction as the Cause of Becoming." Here again we will find ourselves dealing, as we have been right along, with some kind of process which is lower in the scale of complexity than those we have in mind when we talk about psychology. Again, as before, it is one of the types of activity that goes on in psychological processes, constitutes one of its

dynamic factors or its ways of being, yet does not often itself become a content of consciousness, does not often receive conscious representation except on such occasions as this very attempt to state it. It is an unconscious process, but not in the Freudian sense of having once been conscious and then repressed. It is unconscious in the sense of being one of those essential elements in our ways of being which we have not yet become aware of, perhaps because it is the very essence of our being. All this sounds very portentous, yet again I am speaking of something quite commonplace. Attention was called to it by Lillie as one of the characteristic features of the chemical aspect of metabolism. Yet the words he uses could be displaced with very little change to become part of the body of Spielrein's paper. As I say, it is very simple.

In our original model, the vortex, the particles of water enter one side and emerge on the other. They do not lose their identity as water nor as individual particles of water. They do not lose their individuality. All that happens to them is a shift in their spatial properties. From being part of a great formless mass, they participate for a moment in a form. If they were conscious individuals they would experience no feeling of having been subjected to a destructive process by their experience of having been through the vortex. If the form, the configuration, they have flowed through was myself or you, the same things could be said. The individual particles of water would have suffered no loss of identity for having constituted for a time part of *our* being. (I am assuming that the molecules of water are not broken down into their constituent hydrogen and oxygen in their passage through us.) We have already noticed this fact in another way when we stated that a conservative system at a higher level was constructed out of conservative systems at a lower level.

But we do not have to go very far up the scale of chemical constitution to find that things change. One organism ingests another. It does so by breaking down the organism and the organization of its prey. There is reason to suppose that many of the chemical constituents of any living organism have a specific chemical individuality characteristic of that particular individual system from which it came. Protein from a potato, for instance, is recognizably different from protein from a grain of wheat, and both again are different from the protein to be found in the

body of a human being that consumed them. In the process of ingestion they were both broken down into simpler forms, and then reconstituted in the body of the human being as the form of protein characteristic of that individual. If these molecules of protein were self-conscious individuals we would have to suppose them to have experienced a sense of having been subjected to a destructive process. As we follow this process up the scale of complexity and come to vision, we again find the same characteristic feature. The eye, and the mind behind it that takes in a visual configuration, breaks it down into its geometrical constituents, analyzes the visual configuration, as we say, and then recombines this material, sometimes as something not easily traceable to its source. Again, if the visual configuration were a self-conscious individual, it would be able to say that it had been through the destructive mill.

It was at this point that Spielrein came into the picture. For she noticed that the human individual who had to carry out this analysis and reconstitution, this destruction and re-creation, sometimes did so as if it felt the pangs that should have been felt by the object involved. She stated the problem, but did not solve it. For one thing the concepts of narcissism and of identification had not yet been clearly differentiated. We have again come on the situation discovered above, the destructive effect of a self-reflexive process. Again we have reached a nodal point from which we could jump into psychoanalytic theory. But we will stick to our biological course, leaving the mere allusion to Spielrein to produce its own supporting material. Actually we have been restating and expanding one of the points made by Lillie in his paper on "Biological Causation." Acting in his stead, in terms of his point of view, we could retitl e Spielrein's paper: "Analysis as the cause of synthesis." To do so clearly brings out logical if not psychological aspects of her difficulty. If the words were reversed, "synthesis as the cause of analysis," many of these difficulties would be cleared away. The situation clearly becomes one where we have to take something as its own reason for being, since we cannot break it down into something more elemental. The elemental something in this case is the tendency of the steady state to persist as a separate and unique individual something which both analyzes and synthesizes. They are two aspects of one process. To speak of either as the cause of the other, comes pretty close to nonsense.

Mankind has made many attempts in many ways to excogitate a cosmogeny. So far as I know them, their basic postulates run something like this: In the beginning there was a something. There was also a chaos of formlessness. The something created more things out of the formlessness around it. It did this because it did not wish to be alone.

It so happens that we can quote from Lillie's paper a modern version of this same basic cosmogeny: "We have already pointed out that the concept of integration in biology is closely allied to the concept of individuation in embryonic development: the living individual with its automatically maintained unity of mental and physical life comes into existence as a product of the orderly association of materials and energies taken from the environment. Living organisms, whether we consider them as physical or psychical entities, always exhibit this integrative character; they are synthesizing agents, in which special physical and psychical characters emerge as the outcome of an orderly process of synthesis."³⁴ The modern version of the ancient cosmogeny lacks only the psychological motivation. With this we have reached the point we set out to examine in this section. We wished to see what biology and physics have been thinking about the concept of the tendency to maintain stability, to see if there was anything implicit in this mode of thinking that we could recognize as the Freudian "death instinct." We have found everywhere, at every level, indications of a duality consisting on the one hand of a persistent form which maintains itself only under difficulties and limitations, on the other of a mere formlessness (in this sense and only in this sense could we use the word "nothingness"). At such points as the form—by reason of chance, or of a certain type of self-reflexiveness leading to self-contradiction—was threatened with the fate of becoming formless or with the loss of its identity as a form, we could speak of the "death instinct" (our Y). We have tried to show that in the biological field, as in the mathematical, the whole process of life (our X) could be pictured in terms of giving meaning to variables in an empty form. We have indicated, perhaps not very clearly, that the process called creation consisted in the finding of a something where it had not always previously seemed to exist, a concrete external something to put in the place of a vacuity in a form. A good deal of this has sounded like a mere playing with words. But these are the words one wants to play with

34. p. 324, op. cit.

at such points. It has been suggested that this itself is an expression of the very tendency we have attempted to describe.

It is necessary at this point to notice, for the sake of completeness, a feature we seem to have neglected. It is a characteristic feature of living conservative systems (which, as we have seen, must continue to grow) that having reached a certain point of magnitude limited by physical forces such as surface tension, osmotic pressure, and other forces that limit diffusion, this process of continued growth must bring about a cleavage of the given form into two individuals. Such living systems thus have the tendency to reduplicate themselves. This must occur if the system is to maintain its relation to source and sink, for without this continued relation the system dies. We saw fleetingly that this very paper could be regarded, from this standpoint, as a reduplication in the world of visual perception of a figment of my imagination. We saw that a self-awareness of this meaning, reduplication of the self, could have a shattering effect which could be taken to mean an indication of the presence of the "death instinct." It was hinted that it was just at this point that the clinical problem arose which gave rise to the whole investigation into the death-instinct.

The clinical problem, then, was the apparent inconsistency that the tendency to growth and life, having reached the point where it must continue by cleavage into two systems, gave rise to the feeling that this was death and not life (as it is by definition). But this clinical problem is clearly a purely psychological problem and not a biological one. And nothing we have considered in this section would seem to afford an explanation of this shift of feelings to the wrong process.

What we have been saying could be put in other terms. The living organism has a tendency to extend its form and impose it on the world around it. I am stating in very general terms a property of things which as analysts we have tended to think of as being characteristic only of sexuality and sexual reproduction. I state it in general terms to bring out the fact that sexuality in the narrow sense is a special case of a much more general tendency. I would remind you that Freud was forced by his discovery of the "death instinct" to make this same enlargement in the scope of his thought.

What it all comes down to, seems to be: anything that threatens to disrupt the "form" in question can be called a manifestation

of the death instinct. To call it such seems to be indulgence in a bit of anthropomorphism because of the word "instinct." Death is a return to the formless. Since all we can know is the form,—or better, since we only know the formless by contrast with a form and by means of a form,—we see that the "death instinct" is necessarily "silent," has no psychological representation, can have none except in terms of its opposite, life.

The science of thermodynamics is also based on a duality of principles. It has sometimes occurred to psychoanalysts to think of the 2nd law, Clausius' law of the tendency of the entropy of the universe to increase, as an expression of the death instinct. Taking it in terms of probability considerations, this law simply states that there is a tendency for things to proceed towards more "nondescript"³⁵ states. It would be a mistake to think that this means "formless." It means merely "uninteresting." To a bridge player a hand containing no face cards would certainly be nondescript and uninteresting, but it would not be correct to say that it was formless. And it would certainly seem like a misuse of words to speak of it as a manifestation of the "death instinct."

35. *The Anatomy of Science*. By G. N. Lewis, Yale Univ. Press, 1926, p. 135.

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